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THE
TREATMENT OF
BILIOUS DISEASE
—
BY J. H. H. H.

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CHLORIDE OF AMMONIUM

IN THE TREATMENT OF

HEPATIC DISEASE

CLINICAL RESEARCHES
ON THE THERAPEUTIC ACTION OF
CHLORIDE OF AMMONIUM
IN THE TREATMENT OF
HEPATIC DISEASE

WITH ILLUSTRATIVE CASES
BY
WILLIAM STEWART, M.D.

AND RULES REGARDING THE AUXILIARY TREATMENT,
DIET, AND MANAGEMENT OF PATIENTS SUFFERING FROM
CONGESTION OF THE LIVER AND TROPICAL HEPATITIS

BY

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LONDON
SMITH, ELDER, & CO., 15 WATERLOO PLACE

1879

B

نگه ندار و کسی با تو کار
 وی چون بگفتی و لیلش بیا ر

- * 'For what is not said, nobody will meddle with thee ;
 But if thou say anything, adduce arguments in support thereof '
 SÁDÍ, *Gulistán*, chap. iv. stanza iii.

PREFACE.

By the advice of several medical friends, and acting on the suggestions of the late Sir R. Martin and Dr. C. Murchison, (of whose death in the prime of life and usefulness the sad news has just reached this country,) I have, at length, in the following pages brought together in a connected form the substance of my various papers on the treatment of hepatic disease, as they appeared from time to time in various journals at home and abroad.

The method of treatment herein advocated, after a large experience extending over some ten years, is now believed to be assured; while former methods and agents, believed to be not altogether valueless, have been found to be of comparatively little importance. The former treatment of acute hepatic congestion and hepatitis, especially that form so apt to terminate in suppuration, I have been accustomed to look upon as an opprobrium to practical medicine, since of cases of hepatitis six per cent., and of pronounced cases of abscess of the liver eighty per cent.,

or four out of five, terminated fatally ; and yet to this day the practice by which such results were obtained is exclusively lauded in some of the text-books, either from prejudice or for want of practical knowledge of anything better.

A method of treatment which has been tested in an extensive field, and by which death may be made the exception, not the rule, must be my excuse for offering a new volume to the profession, 'groaning' as the shelves of private and public libraries are 'under their ever-increasing loads.'

If this digest of my views upon the treatment of hepatic disease, with the results of my experience down to the present time, prove interesting to the profession, and if it aid in the alleviation of suffering, the saving of life, and (however slightly) in the advancement of the healing art, I shall be amply rewarded for the time and labour I have bestowed upon it.

SECUNDERABAD, DECCAN, INDIA,

May 27, 1879.

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HEPATIC DISEASE.

CHAPTER I.

PRELIMINARY AND GENERAL REMARKS.

HEPATIC disease is the cause of much sickness, invaliding, and mortality among Europeans in India, and the tendency of tropical hepatitis to eventuate in hepatic abscess renders it one of the most formidable diseases with which the Indian practitioner has to contend. The chronic enlargement of the liver, so often seen in the persons of those who have long resided in hot climates, is generally the result of hepatic congestions more or less acute accompanying or following upon severe malarious fevers, dysenteries, or diarrhœa; or it may ensue on lengthened residence in India alone, in the more malarious parts of the country, without the intervention of any disease whatever: in other words (says Sir R. Martin), the interference of an unnatural climate during years with the natural functions of the liver leading directly to functional disorder, and eventually to structural disease.

Early in my course of service in India I became aware of the little benefit to be derived from any of the modes of treatment then recommended in congestion of the liver and tropical hepatitis, and I sought in vain among the numerous text-books for a therapeutic agent of sufficient efficacy to control the hypercæmia, if possible, in the acute or early stages, and thus prevent its passage into the more fatal and chronic forms.

Chloride of ammonium had been for a long time used in frequently repeated small doses in various hepatic disorders, and some authors alluded to it cursorily among the medicines recommended in cirrhosis (Watson, Tanner), or as a mild tonic in hepatic abscess (Copland), or as an eliminant when suppuration had taken place (Morehead). My first trials of the salt, in May 1869, in cases of abscess of the liver, soon convinced me that in chloride of ammonium we had an agent of great value, when used in large doses and persistently administered.

As a result of further investigation, I observed a remarkable train of effects to follow its administration in certain cases; that the characteristic and special symptoms induced by the salt were more marked in some cases than in others; and that this difference appeared mainly to depend on the amount of the attendant hypercæmia, or the acuteness of the liver congestion: in short, where the latter conditions were considerable, the characteristic and special action of the medicine was most marked. I was thus led to give the salt a trial in the various forms of

liver congestion and acute hepatitis, and at length in 1870, in a pamphlet published in Rangoon, British Burmah, I laid before the profession my views on the subject; and in it and subsequent papers published in the Indian medical journals I arrived at the conclusions embodied in the following statements:—

1. That congestion of the liver and acute hepatitis, when brought under treatment in the early stages, may be as effectually controlled and cured by the administration of the chloride of ammonium as dysentery by ipecacuanha or ague by quinine.

2. That the only contra-indication to its use is a combined hot and dry state of the skin; but that, the skin being made moist by suitable means, its administration should be at once commenced, and continued as long as local sense of pain, tenderness, or other uneasiness exists, or till it no longer produces any sensible effects, and in smaller doses for some time longer.¹

3. That the occurrence of suppuration is no reason for abandoning the use of the ammonium chloride. On the contrary, as it is a consequence of, and is accompanied by, hepatic congestion, pain and tenderness, and more or less pyrexia of an irritative or hectic type, with tendency to dysentery, it best meets the indications of the disease, not only by its special action on the portal circulation, by which the liver is relieved, its functions improved, and dysentery prevented, but by exerting a life-saving influence when persistently administered, and in protracted

¹ See Appendix, page 89.

cases affording actual support to the system, while the abscess is either being absorbed, or is discharged by operation, or makes its escape by one of the usual channels.

4. That it affords much relief in cases of mechanical hyperœmia of the liver, the result of cardiac or pulmonary obstruction.

5. That it is highly efficacious in cases of jaundice depending on hepatic congestion with retention of bile; and in certain functional derangements often ascribed to 'torpor of the liver'—attended by lithœmia (Murchison), indicated by the appearance in the urine on cooling of deposits of lithic acid, lithates, and pigmentary matters—associated with congestion of the liver, want of sleep, and depression of spirits.

6. That although the characteristic action of the medicine, (general and special,) is most marked in cases of congestion of the liver and primary acute hepatitis, still we must not expect to find the same speedy relief from pain and general improvement, in all the symptoms, to follow its use in every instance, without reference to the stage of the disease in which it is administered, the temperament of the patient, the diathesis, or the existence of the various cachexiæ, as well as the complication of other diseases.

7. That when the sensible and characteristic action of the medicine is manifested in any given obscure case, such characteristic action is diagnostic of hepatic disease.

A more extended clinical experience has served to confirm the views then enunciated, to clear up

others, and to establish the success of the treatment under varying circumstances of station and climate.¹

It is assumed that the reader is familiar with the etiology, symptomatology, and morbid anatomy of the diseases under consideration, and hence in the observations which follow I shall confine my remarks to one or two preliminary points requiring attention, referring the reader to systematic writers on the subject for further details.

Hyperœmia of the liver may be due to increased flow of blood to the organ (determination), or obstructed flow (congestion). There is determination normally to the liver at each digestion. In persons who eat and drink immoderately this physiological determination becomes excessive and continues longer, and like other frequently repeated hyperœmiæ may induce permanent dilatation of the vessels. Under normal circumstances the hepatic capillaries find a support in the parenchyma—these dilate when the parenchyma becomes relaxed, thus rendering an abnormally slight resistance to the blood entering the liver. The hyperœmia of the liver occurring after injuries of that viscus or in the vicinity of inflammations and neoplasia appears to develop in this way (Niemeyer). The cases induced by the use of spirituous liquors also probably belong to this class, as the alcohol is conducted directly to the liver by the portal vein. It there acts as an irritant, inducing changes of the parenchyma of the irritated organ,

¹ See Dr. Murchison's *Lectures on Diseases of the Liver*, 2nd edition, 1877, pages 136, 187, and 624.

accompanied by a diminution of its resistance, resulting in dilatation of the capillaries and increased flow of blood to the part.

We are just as ignorant whether the cases of hypercæmia of the liver from infection of the blood with malaria, or those occurring so frequently in the tropics, depend on relaxation of the parenchyma, or whether they are due to a neuro-paralysis of the efferent blood-vessels, or to a textural change of their walls, as we are concerning the hypercæmia and textural changes in other diseases. Congestion of the liver is of more frequent occurrence than determination. The blood which flows from the liver through the hepatic vein has passed through a double set of capillaries, and this is true also of the blood supplied by the hepatic artery—the capillaries of which unite to small venous trunks which do not empty into the hepatic veins but into the portal veins, and with these again break up into capillaries. Hence the lateral pressure in the hepatic veins is very slight, requiring as a compensation the suction force communicated to the current of blood by the action of respiration. The deeper the inspiration the greater the force with which the blood rushes by the large veins to the right auricle. These reasonings, (first given in a paper by Mr. Shaw,) have been confirmed by certain experiments of M. Bernard, who has found that, when an incision is made into a lobe of the liver in a living animal, the blood may be seen to jet from the mouth of the hepatic veins during the

movement of expiration, but to return, sucking in air with it, at each deep inspiration, so that the animal soon dies from the passage of air into the heart. 'In persons, then, who lead a sedentary life, this auxiliary force for promoting the circulation of blood through the liver is diminished, blood stagnates in the gland, and the functions of the organ are deranged; these results being all the more likely to arise if the liver be at the same time over-stimulated by errors in diet.'¹ In persons resident in hot climates, where the rarefaction of the air and a corresponding diminution in the supply of oxygen to the system favour certain functional derangements, and particularly those relating to sanguification and disintegration of albumen, such results are rendered all the more certain. Prior to the publication of Dr. Murchison's classical and scientific Croonian Lectures our knowledge of the functional derangements of the liver was anything but satisfactory. Dr. Murchison has shown that there are grounds for suspecting that many symptoms, at first sight apparently referable to other organs, and even grave degenerations of tissue and organic disease, not only of the liver itself, but throughout the body, may be traced back to functional derangement of the liver, although some of these may as yet be imperfectly understood. It is now known that the liver is not only a blood-forming, but a blood-destroying or purifying organ,

¹ Dr. Murchison's *Lectures on Diseases of the Liver*, 2nd edition, 1879, page 611.

and that it contributes in a great degree to the destruction of albuminous matter derived from the food and textures, and the formation of urea and lithic acid, which are subsequently eliminated by the kidneys.

CHAPTER II.

GENERAL ACTION OF THE AMMONIUM CHLORIDE IN HYPERCÆMIA OF THE LIVER—POINTS TO BE OBSERVED IN ITS ADMINISTRATION IN CASES OF CONGESTION OF THE LIVER AND TROPICAL HEPATITIS—ILLUSTRATIVE CASES.

As already stated, the only contra-indication to the use of the remedy in hepatic disease is the existence of pyrexia with a dry state of the skin. This is best relieved, and the skin prepared for the action of the medicine, by the administration of the liquor ammoniæ acet. in frequently repeated small doses. The patient being confined to bed, and attention to the rules for diet and nursing strictly enforced,¹ the chloride of ammonium should be administered, in twenty-grain doses, twice or thrice daily, noting carefully its effects, which are striking and remarkably regular in the order of their occurrence.

As a general rule, about fifteen minutes after taking the medicine the patient experiences a sensation of warmth in the epigastrium, which by-and-by extends, pervading the abdomen, and gradually becomes diffused over the entire cutaneous surface. The nervous system is at the same time exhilarated

¹ See page 43.

sympathetically and also through the circulation, for the patient now feels 'light-headed,' as he generally expresses it, and at times drowsy. The acute pain previously experienced in the right hypochondrium and along the margins of the lower right ribs, extending, as the case may be, forward across the epigastrium, or backwards to the lumbar region, is either entirely removed, or, in its stead, pain is sometimes referred to a point higher up and towards the base of the axillary region, where before none was complained of. At this stage of the operation of the remedy the patient often falls asleep, relieved of all his distressing symptoms.

After the lapse of another quarter of an hour, a free and equable perspiration takes place over the entire surface, which lasts for a period varying from one to two hours. In the meantime, the pain, which had shifted from the lower margins of the inferior ribs of right side, will again manifest itself at or near its original position, or may be referred to one totally different, as the lumbar region, or even the right hip. With the next dose similar effects will be observed to take place with like regularity and certainty, and with each succeeding one, the interval of relief from pyrexia—in cases of acute hepatitis—and pain referred to the part affected, as well as sympathetic pains of the shoulder, arm, &c. (which latter are at times distressing), will gradually become longer, till at length, in favourable cases, the relief becomes complete and constant. After several doses of the medicine the urine is much increased in quan-

tity, particularly in the cold season, is limped, and passed without uneasiness.

After a few days the appetite is much improved, and the patient craves for more food, which may be given, provided it be light, nutritive, and easily digested; but solid food should on no account be permitted, as its ingestion would in all probability provoke a recurrence of all the acute symptoms.

During the use of the medicine care must be taken that the patient does not catch cold when perspiring, and when perspiration has ceased the surface should be dried with warm towels, otherwise chills may be experienced.

The following cases illustrate the beneficial action of the remedy, as well as the characteristic symptoms following its ingestion, in cases of congestion of the liver and tropical hepatitis.

CASE I.—*Congestion of the Liver (Simple Enlargement).*

Private O. D. was admitted to hospital at Thayetmyo, B. Burmah, on June 24, 1871, complaining of pain in the situation of the twelfth rib of right side, and inability to lie on the left side on account of a dragging pain in right hypochondrium experienced in that posture. The latter symptom had been present for a week or more previous to admission. No pyrexia; pulse and respiration normal. On inspection a bulging of the right side of the chest, extending from the angle of the ninth rib downwards, was apparent. The liver was enlarged, hepatic dulness extending in the right mammary line about an inch beneath the costal cartilages. In the epigastrium the area of hepatic dulness was also increased. The right side of the chest, at the level of

the ensiform cartilage, measured eighteen inches and one-eighth; the left, sixteen inches and three-quarters; being a difference of one inch and three-eighths, or two inches and three-eighths more than normal, the patient being left-handed. Patient was much emaciated, and his muscular development was poor, but the left arm over the biceps was one-eighth of an inch larger than the right.

Bran fomentations were ordered to the seat of pain in the side, and a podophyllin pill, as the bowels were confined. As there was no pyrexia, the chloride of ammonium was commenced on the following day (25th) in twenty-grain doses thrice daily.

June 26.—The medicine acted characteristically in relieving the pain, and inducing perspiration with the usual characteristic symptoms. Patient could now lie on the left side without uneasiness, and pressure could be borne over the twelfth rib, where before there were pain and tenderness. The prominence at the posterior part of base of right thorax was almost gone. The chloride of ammonium was continued, and beef tea diet was ordered, with one pint of beef tea extra.

June 28.—Pain and uneasiness were completely gone. Chloride of ammonium was reduced to five grains thrice daily.

July 3.—The chloride of ammonium was omitted, and a mixture of quassia and iron was prescribed, as patient was anæmic.

July 5.—Discharged to duty.

CASE II.—Congestion of the Liver and Chronic Enlargement successfully treated with Chloride of Ammonium.

Corporal J. H. was admitted to hospital on May 23, 1870, complaining of pain of right side and shoulder, with inability to lie on the left side in consequence of dragging pain in the hepatic region. There was much tumefaction of right side of chest and abdomen, and pressure could not be borne

beneath the margins of right costal cartilages. There was slight pyrexia. When in Bellary, in 1864, suffered from an attack of 'acute hepatitis,' and since then has had several admissions with 'chronic hepatitis.' On percussion, the right lobe of the liver was found to extend, in front, from the fifth rib to within two inches of the crest of the ilium; thence the lower margin of hepatic dulness was traced inwards and upwards in a curved line, the convexity of which passed about three inches above and a little to the right of the umbilicus. The right side of the chest, at the level of the ensiform cartilage, measured an inch and a half more than the left.

He was ordered diaphoretic mixture in frequently repeated doses, and when diaphoresis was induced, scruple-doses of chloride of ammonium morning and evening. Tea diet was prescribed, with milk two pints and beef tea two pints.

The medicine acted characteristically with relief to all the symptoms, and on June 5 it was noted—Since last report has progressed favourably; urine much increased in quantity, passes water every hour; pain of side and shoulder much relieved, and fulness of right hypochondrium and right side of abdomen much reduced. Measurement at level of ensiform cartilage shows half an inch reduction of right thorax. The treatment was continued, and low pudding diet with two eggs was ordered, patient being all this time confined to bed.

On the 15th the fulness of side was completely gone, and, as the bowels were confined, he was ordered a dose of castor oil. On the 20th he was progressing favourably, and the appetite had returned. The lower margin of liver now extended but two inches beneath the right costal cartilages, and there was no pain, except on pressure over the margin of liver. He was now allowed half diet and two eggs, and was permitted to sit up for a short time during the day. On June 29, having steadily improved in health and strength, he was discharged from hospital. The medicine was persistently administered up to the above date, and with marked effect in relieving pain, improving the general health, and

reducing the liver enlargement. By tracing the lower line of hepatic dulness with ink on the abdominal wall, the liver was seen to recede daily under the use of the medicine, till at length, on the day of his discharge, its margin was but little more than an inch beneath the right false ribs, and all pain and tenderness on pressure had vanished.

CASE III.—*Functional Derangement of the Liver, associated with Congestion of the Liver and Depression of Spirits.*

Sergeant A. F., a strong and otherwise healthy man, of eight years' service in India, (who had seldom been in hospital, and never before suffered from hepatic affection, but had an attack of ensolation in Secunderabad in 1867,) was admitted to hospital on November 26, 1871, complaining of loss of appetite, bitter taste in the mouth, sickness of stomach, and vomiting on rising in the morning and after taking food.

These symptoms had been present for some time, and patient was weak and desponding, and his countenance anxious and sallow. On interrogating him as to hepatic pain or uneasiness, he stated that for a considerable time past he had suffered from sense of weight and uneasiness in the hepatic region, and a dragging sensation in the right hypochondrium when lying on the left side. The tongue was coated with a brown fur; skin cool; pulse natural; enlargement of liver chiefly upwards. Was ordered a podophyllin pill and two doses of simple diaphoretic mixture, (the skin being dry,) before commencing the chloride of ammonium, of which twenty grains were exhibited in the evening.

Nov. 27.—He stated that shortly after taking the medicine yesterday evening a profuse perspiration broke out all over his body, and he felt much relieved. The pill was repeated, as the bowels had been but slightly acted on, and in the evening twenty grains of chloride of ammonium were administered. Tea diet was ordered, with two pints of beef tea and one pint of arrowroot.

Nov. 28.—Sickness of stomach gone, also bitter taste in mouth; tongue clean; appetite improved. The medicine, in addition to the ordinary symptoms, (epigastric warmth, perspiration, &c.,) caused a sensation 'as if water were trickling' in the right hypochondrium, which was felt shortly after taking the dose. The chloride of ammonium was continued in twenty-grain doses thrice daily. Beef tea diet was ordered, with two pints of beef tea extra.

Nov. 30.—Patient's countenance was clear and bright; all hepatic uneasiness gone; he could lie with ease on either side, and his general health was much improved.

Dec. 2.—Discharged, and ordered to attend hospital a few days, during which time the medicine was continued in ten-grain doses.

Note.—From the above date till June 1872, patient enjoyed good health, and had no recurrence of hepatic symptoms.

The following case, which was kindly forwarded to me by Surgeon J. A. Clery, M.B., A.M.D., I give *verbatim*, as it well illustrates the efficacy of the ammonium chloride in cases of tropical hepatitis.

CASE IV.—*Tropical Hepatitis.*

Private Stevens, æt. 27, was admitted into hospital on May 30, 1872, suffering from acute hepatitis. During his protracted service in India, of eight years' duration, he had enjoyed good health, until, on arrival in Secunderabad in January last, he was seized with pains in the hepatic region, which subsided in a few days, but returned with renewed intensity on the night of May 28.

The following notes of his case were taken on June 1:—Patient's face is flushed, and expressive of great suffering; his brow contracted; breathing short, and apparently attended by much distress. The skin has a mottled appearance, and

on the application of the hand communicates a burning sensation. Temperature 103° ; the pulse beats 100, full and throbbing; the heart's action is excited, but unattended by any deviations from the normal sounds. Dyspnœa and a short dry cough prevail, for which we can find no adequate physical signs, as there is normal resonance all over the chest, except towards the base of the right lung anteriorly; and the respiratory murmur, although louder than natural, is otherwise unaffected. Tongue is furred; appetite deficient; thirst urgent and distressing. He complains of acute pain over the liver, extending along the borders of the false ribs and all up the side to the shoulder; this pain is aggravated by lying on the right side; most relief is felt on the back, inclined to the left side. All over the painful part there is exquisite tenderness. Greater part of the abdomen is tympanitic; but we find increase of dulness in the right hypochondriac region, extending downwards to a level with the umbilicus, and upwards to the fifth rib. His temper is irritable; depression of spirits prevails, with restlessness and want of sleep.

I prescribed a podophyllin pill and diaphoretic mixture (one ounce every two hours until diaphoresis set in). Locally, six leeches were applied, followed by fomentations over the hepatic region.

June 2.—The dry heat of skin has been replaced by free diaphoresis, attended by some slight alleviation of his sufferings. Temperature 101.4° ; pulse 105. I prescribed twenty grains of chloride of ammonium, morning and evening, the fomentations and diaphoretic mixture to be continued during the day.

June 3.—Stevens enjoyed a good night's rest, and appears quite cheerful to-day. The following is his description of the effects following the administration of the drug:—‘The medicine had a saltish taste, which produced an inclination to vomit; this was followed by heat in the side, which extended all over the body until I was covered with perspiration. In about an hour's time I subsided into a refreshing sleep, and, on awaking, felt that the pain had vanished.’ The

temperature in the evening had fallen to 99.8° , and the pulse to 98.

June 4.—Pain has returned, but in a mitigated form. Temperature 99.8° ; pulse 100.

June 5.—Improving; continue chloride. Temperature 99° ; pulse 100.

June 6.—Pain and tenderness over the hepatic region have greatly abated; the dulness has descended from the fifth to the sixth rib, neither does it extend further than one inch below the false ribs. Pulse 95; temperature 99.8° .

June 7.—Much relieved; slept well. As patient looks ill and anæmic, I allowed him six ounces of wine. Temperature 98.8° ; pulse 80.

June 8.—Patient is altogether free from pain, except when he attempts to lie on the right side; the liver is apparently reduced to its normal dimensions. Reduced the chloride to five grains *bis in die*.

June 10.—Patient may now be said to be convalescent, as he is quite free from pain, except in violent exertion; can lie on either side with perfect ease, but on taking a full inspiration he feels a slight catch in his side. Temperature 98.8° ; pulse 78.

June 15.—Since last report patient has been progressing favourably; his appetite is good, and strength returning.

June 20.—Discharged convalescent.

The foregoing cases illustrate the efficacy of the chloride of ammonium in the various forms of congestion of the liver met with in India and other tropical climates; but congestion of the liver and functional derangements are of more frequent occurrence in this country than is generally imagined. The following case which has lately come under my notice is cited in illustration of the great utility of the medicine in hepatic congestion in this country. It is

interesting too, as showing how, 'independently of either hypochondriasis or melancholia, persons with functional derangements or structural disease of the liver are subject to fits of great depression of spirits, and often groundless fears of impending danger, which cease when the liver is restored to its normal state.'¹

CASE V.—*Congestion of the Liver, attended by Want of Sleep and Depression of Spirits.*

Private E. C. S. was sent to the station hospital, Brecon, for observation for mental disease, on June 15, 1878. The following is an abstract of his case from the hospital case book:—

From the statements of the non-commissioned officers and men occupying patient's barrack room, it would appear that he has been noticed to be peculiar in his manner—to be moody and taciturn—from the date he joined this station, about a week ago. He has invariably refused his barrack food; was noticed to be sleepless at night, and to wander about the barrack room, making no reply when spoken to. Patient says that he had yellow fever in Bermuda in 1868, after which his liver became affected, and he suffered from dyspepsia. Before enlistment he was a clerk, but had been out of employment in London since last Christmas, which preyed upon his mind.

At the present time patient appears rational, but is observed to be depressed in spirits and apathetic; he is pale, anæmic, and suffering from general debility. His respiration is normal; heart's sounds weak; temperature normal, also pulse; tongue white, flabby, and lobulated; lips and gums pale; bowels regular. There is exquisite tenderness, on pressure, over the epigastrium and along the margins of right

¹ Dr. Murchison's *Lectures on Diseases of the Liver*, 2nd edition, p. 591.

false ribs. Marked fulness at pit of stomach. Liver congested, extending in the median line to within an inch of the umbilicus, and in the right mammary line for two fingers' breadth beneath the false ribs.

To have chloride of ammonium, fifteen grains thrice daily.

June 16.—Feels easier and more comfortable. About an hour after the ingestion of the medicine patient felt hot and comfortable about the epigastric and right hypochondriac regions; a 'bubbling' sensation was also experienced at the pit of the stomach and a little below that situation. The heat gradually extended to his feet, which before were cold, and had been habitually so for some time past. States that he feels better generally. Continue the medicine. Milk diet.

June 17.—Medicine continues to produce its characteristic effects in a modified degree. The tumefaction in epigastrium is not so great, and the pain and tenderness there and under right costal arch are less exquisite; gentle pressure can now be borne in the above situations. His appetite is improved; he looks better, and sleeps a little better at night. Continue the medicine and diet, and to have an extra pint of milk.

June 18.—Medicine still produces its characteristic effects, now, however, in a slighter degree. Liver congestion and enlargement reduced in a marked manner, and the pain on pressure is much abated. Continue treatment, and to have at bed-time ten grains of chloral with ten of bromide of potassium.

June 21.—Patient slept all night after the chloral mixture, and on the 20th he expressed a wish for more to eat, when he was ordered eight ounces of extra bread. The medicine still produces a feeling of heat and comfort after each dose, but its action is not marked, as the liver enlargement is now quite gone, and there is no pain or tenderness on gentle pressure.

June 27.—Continues to improve in general health; he

now sleeps well, and enjoys his food. To have half diet, and to take the chloride of ammonium in five-grain doses thrice daily.

On July 6, patient having displayed no symptoms of mental disease, the attendant who had been placed over him was removed, but patient was kept in hospital till August 7 for further observation regarding his mental state, when he was discharged fit for duty.

CHAPTER III.

SPECIAL SYMPTOMS PRODUCED BY THE DRUG WHICH ARE PECU-
LIARLY AND DIRECTLY REFERABLE TO THE LIVER AND RELATED
PARTS—EXPLANATION OF ITS ACTION—ILLUSTRATIVE CASES.

IN the preceding chapter I gave an account of the more obvious symptoms experienced by the patient after the exhibition of the ammonium chloride ; some of which, as the diaphoresis, diuresis, &c., being objective, are easily ascertained by the physician.

I have now to speak of certain symptoms, not mentioned hitherto, more immediately referable to the direct action of the medicine on the congested or inflamed liver. These, if not previously understood, might lead to its abandonment, on the supposition that it was acting injuriously ; indeed, I have known the attendant phenomena construed by the physician, as well as by the patient himself, as evidence of the medicine disagreeing so as to contra-indicate its use. The explanation of the direct action of the remedy on the congested or inflamed liver is not so obvious as that of its general action ; and were it not that I consider it of more than mere theoretical interest, I should hesitate to offer an explanation ; and I do so chiefly with the view of calling the attention of those

who may have the means and the necessary ability for instituting such researches to what appears to be a question of much practical interest and importance.

The symptoms now to be described occur shortly after taking the medicine, (in from five minutes to half an hour,) and are referable either to the liver or related parts. They are variously described by different patients; a circumstance not remarkable when we consider how different may be the description of material, form, and colour, by different individuals concerning one and the same object. Sometimes a 'shock' is felt, or as if 'something gave way' in the side; at other times, a succession of shocks is experienced in the hepatic region, accompanied or not by a pricking sensation, ('pins and needles,') or as if cold water were trickling over the side; or the action is described as that of 'a pulling' from one hypochondrium to the other, or from the margin of the right costal arch upwards and backwards, as if through the liver; or a 'clawing,' 'working,' or 'gnawing sensation' is spoken of as felt by the patient. When a single sharp shock is experienced in a debilitated, nervous, and susceptible subject, it is generally severe, and I have known the patient to cry out in consequence, frightening the other patients in the ward, and being himself alarmed. Immediately afterwards the severe hepatic pain vanished, and never again returned with its original severity; and with each succeeding dose, a sensation of 'pulling' only was felt in the hepatic region, till at length all sensible action ceased with the removal of the hepatic con-

gestion, the case being one of simple enlargement of the liver. In acute hepatitis and active congestion of the liver the special and characteristic action of the medicine will be found to be more marked than in cases of chronic hypercæmia with enlargement, or in abscess of the liver, for reasons which will be apparent from a consideration of the *modus operandi* of the salt.

In primary acute hepatitis, only a limited portion of the liver is inflamed, and even of this portion it is reasonable to suppose, as stated by Morehead, that the inflammatory process is confined to the capillaries of the hepatic artery, leaving the remainder of the organ free and capable of carrying on its proper functions, viz., the secretion of bile and the formation of sugar and urea, the latter of which is now believed to be formed for the most part in the liver. Accompanying the inflammation there may be, and there frequently is, both portal, venous, and biliary congestion. Under these circumstances, the special action of the remedy appears explicable in the following way.

Owing to its high diffusive power, the medicine is rapidly conveyed to the liver through the portal circulation, (for which in certain diseased conditions it appears to possess an elective affinity,) where it acts as a direct stimulus to the nerves supplied to that viscus. The impression produced on the nervous filaments, (cerebro-spinal and sympathetic,) supplied so abundantly to the vessels and ducts of the gland, and even entering into the secreting cells according to the latest observations, is conducted to the adjacent

ganglia of the sympathetic and spinal cord, whence motor impulses are reflected to the vessels and ducts of the gland, stimulating the capillaries of the vena portæ, which are but little affected by the heart's action through the general circulation, and accelerating the flow of blood through them, thereby bringing about the secretion of bile and the other products formed in the liver—processes which were in part arrested or inefficiently performed owing to the existence of the liver congestion. At the same time, and in a similar manner, the larger bile ducts are stimulated to contraction through the organic muscular fibres which their coats possess. (The ureter and common bile duct possess in their coats muscular fibres; they contract when irritated, and sometimes manifest peristaltic movements.—Müller.) These contractile movements, and the increased rapidity of the circulation in the portal vessels, possibly give rise to the minor sensations experienced by the patient in the hepatic region.

With the local actions thus excited in the liver and related parts—when a full dose of the medicine has been taken—the impression is conducted through the nearest ganglia of the sympathetic to others more and more distant, till at length through the rich ganglionic structure, which Meissner has shown to exist in the submucous tissue, motor impulses are communicated to the muscles of the intestinal canal, causing its peristaltic motions to become more rapid and energetic, as evidenced by the twisting and other movements experienced in the situation of the duodenum,

or all over the abdomen, and which at times are more sensibly felt in particular parts, in the situation of the umbilicus, or in the inguinal region.

Coetaneously with the above, the medicine is carried through the entire circulation, and the glandular apparatus of the intestinal canal, as well as the glands of the entire system, is stimulated throughout its length to increased secretion; while, owing to the contractions of successive portions of its muscular coats, the circulation in the radicals of the portal vein is rapidly accelerated, and a *vis a tergo* propels the blood forward through the portal vein to furnish fresh materials for the increased functional activity going on in the liver, thereby aiding the *vis a fronte*, the result of the constantly renewed attraction for a fresh supply, which the rapidly secreting cells demand; and thus it is that a local depletion is not only effected in the liver by each succeeding dose, but the entire portal system is relieved from congestion, preventing the occurrence of dysentery, so apt to supervene in hepatitis, and particularly in hepatic abscess.¹

¹ The sensations accompanying the peristaltic actions described above are not of a painful or unpleasant character; they are unlike the tormina or griping pains accompanying the action of purgatives, or those felt in looseness of the bowels. The medicine rarely or never acts as a purgative in hepatic disease; but if in any particular case, with a tendency to gastro-intestinal irritation, such an effect should follow its use, the exhibition of an opiate or a few drops of chlorodyne with each dose would be found to restrain it. But no medicine should be added or otherwise prescribed with the view of counteracting the 'twisting' depending on peristaltic action merely, which is highly purposive, and as such is not attended with pain.

The effects of muscular pressure on the circulation are well shown by the acceleration of the stream of blood when, in venesection, the muscles of the forearm are put in action; and this circumstance is taken advan-

Simultaneously with, or closely succeeding to, the above phenomena, I have known the abdominal muscles thrown into tonic contractions, certain portions of their fibres standing out tense and prominent, so as to be perceptible to both sight and touch, by the original impression conveyed through the various ganglia and their communicating branches to the spinal cord; the motor impulses thence issuing being highly purposive and co-operating in a remarkable manner, with the actions above described, to relieve the affected viscus, as I shall endeavour to show in the sequel. Dr. Anstie, who regards the pain of neuralgia as arising from defective nervous energy, considers that chloride of ammonium acts in that disease as a nervous stimulant, by increasing the supply of blood to the painful nerve, and thereby heightening its nervous energy.

The pain in the right hypochondrium in hepatic affections is probably in part relieved in a similar manner by the stimulation of the nervous fibres which are the seat of pain, and the impression thus made being diffused, transferred, or reflected, gives rise to the various sympathetic and transient painful sensations occurring shortly after the ingestion of the medicine, viz., the 'shock' and 'tingling,' or the sensation of 'pins and needles' in the right hypochondrium or adjacent parts. In like manner, the pain referred to distant and non-related parts under the operation of the medicine may be explained.¹

tage of by the surgeon in the event of the blood not flowing freely from the vein, or only in a languid stream, and when it may be necessary to produce a more rapid effect on the general circulation.

¹ See Appendix, p. 81.

The symptoms above described are more marked in weak, nervous, and susceptible subjects, and are more likely to occur in those residing in warm or humid climates than in the colder climates, or in cold or elevated regions, as the hill-stations or the higher table-lands of India. I have known the abdominal muscles of the right side thrown into tonic contraction, and so remain for half an hour, after taking the medicine, in the case of a patient, weak and anæmic, and suffering from congestion of the liver. The contraction in this case was preceded by a series of shocks in the abdominal walls.¹ In several others the abdominal muscles were similarly affected according to the testimony of the patients.²

Now if this action of the medicine could be shown to take place in all instances, and I think it is rendered highly probable from what has been above stated, another mode in which it may afford relief to the affected viscus, the pain of which is in part owing to, or aggravated by the accompanying portal and biliary congestion, seems clearly demonstrated. The pressure exerted on the liver by the contractions of the thoracic and abdominal muscles causes a rapid flow of bile into the duodenum through the common duct, which at once relieves the liver of congestion

¹ On several occasions, in about half-an-hour after the ingestion of the medicine, the patient alluded to experienced like contractions of the abdominal muscles.

² The abdominal muscles, being under the influence of the will, are more likely to have their actions interfered with by the patient's attention being directed to them, and unless the actions become, as in the instance narrated, allied to spasm, (being preceded by spasmodic shocks and contractions,) they may escape observation altogether.

from retained biliary secretion, while the increased formation of the latter, consequent on the more rapid circulation in the portal capillaries, unloads them, and through them the capillaries of the hepatic vein with which they communicate, so as to ultimately unload the congested capillaries of the hepatic artery, the seat of the inflammatory process.

That pressure thus exerted causes the bile to flow from the common duct, is proved by the experiments of Dr. Hughes Bennett, for a detailed account of which the reader is referred to the *Lancet* of January 16, 1871, from which the following is taken.

These experiments were made to determine the question whether, as affirmatively asserted, mercurials possess any specific power of exciting the biliary secretion by acting on the orifice of the common bile duct, and so stimulating the secretion through the nerves which connect it with the liver, just as pyrethrum or vinegar stimulates the salivary glands when it is applied to the orifices of the salivary ducts.

Several mercurial compounds used as medicines were treated in such a way as to approximate their condition to that which they would assume when digested for a while, and then applied to the orifice of the common bile duct of a chloroformed rabbit; and different applications failed in exciting the escape of bile. The same result followed the application of a mechanical irritant, acetic acid, powdered calomel, bichloride of mercury, and the two poles of an interrupted electric current to the gall bladder

itself, or the liver. But an occurrence of practical significance was noted. When the abdominal or thoracic muscles were excited by the induced current, then a free flow of bile from the common duct occurred.

The pressure exerted on the liver and gall bladder by the contractions of the surrounding muscles causes the bile to flow into the duodenum, and hence the value of exercise in certain bilious complaints.¹

But there are other processes depending on the action of the cells of the liver, perhaps directly influenced by the nerves, as well as indirectly through the circulation, which are stimulated to increased energy by the operation of the medicine, and which, co-operating with the above, are instrumental, not only in restoring the healthy state of the capillaries of the inflamed or congested liver, and causing the absorption of its morbid products, but also in purifying the circulation of the entire system.

Pflüger has ascertained the important fact that the nerves of the salivary glands are in direct continuity with the gland tissue through the intermediation of the secreting cells which line the alveoli and ducts, and that fine branches, apparently both of the cerebro-spinal nerves and of the sympathetic, may be traced into the nuclei of the cells, the latter

¹ The surgeon is aware of the fact that, in engorgement of the female breast with milk, which, if not promptly relieved, leads to inflammation, gentle but steady pressure with both hands embracing the breast, and thus squeezing out the milk, affords instant relief in the absence of a breast pump, or a shield to protect a chapped nipple preventing the child being put to the breast.

appearing as clavate expansions or terminations of the nervous fibres. Pflüger says he has traced nerves also into the glandular cells of the liver. These facts are of great interest, showing the intimate connection that exists between the nervous system and all parts of the organic framework; and we can no longer be surprised at the powerful influence exerted by the nerves over glands.¹

Bernard's experiments appear to prove that the rapidity with which the sugar-forming process goes on in the liver is directly proportioned to the rapidity of the portal circulation, and hence it is that irritation of the various parts of the nervous system, especially of the sympathetic, causes an increased formation of sugar by stimulating the portal circulation.

Dr. Parkes in his Croonian Lectures on the elimination of nitrogen from the human body, conclusively points out that it is in the immense glandular and cellular structures, and chiefly in the liver, that the conversion of albumen into urea takes place. 'The albumen that circulates or forms the store from which the organs take their supply is unstable, and is constantly being transformed into urea as it passes through the various cells composing the glands. The albumen, entering as a colloid body, diffuses into or out of the cell as the crystalline urea, and is then washed into the torrent of the returning circulation, and is excreted by the kidneys. In health

¹ See the *Lancet* of July 4, 1868, for an interesting account of these researches.

the urea does not come from the muscles and nerves except indirectly, and in an inconsiderable degree. The greater part of the urea comes directly from the conversion of the albumen of the blood in the glandular organs.

The organ albumen, so stable in health, breaks down in pyrexia, and becomes rapidly changed into circulating albumen, which is then transformed into urea and the other nitrogenous excreta in the liver and other glands.

Dr. Parkes states, 'Nearly thirty years ago in India I examined the urine in a number of cases of hepatitis and hepatic abscess, and while I found that in some instances there was abundance of urea, in others there was scarcely any, and in some it appeared to be wanting altogether. On looking further into this matter it seemed to me that the cause of the difference was to be found in the amount of the suppuration. When this was excessive, so that the secreting substance of the liver was almost entirely destroyed, the amount of urea was greatly lessened, and in a degree proportioned to the extent to which the secreting cells were destroyed by the abscess; and on the contrary, when the liver was not suppurating, but was actively congested and enlarged, with no doubt very rapidly secreting cells, the amount of urea, as well as of uric acid, seemed to be increased.' Lately Dr. Parkes had an opportunity of more accurately observing this point, and of confirming the accuracy of the above observation.

'A case of hepatic abscess was under the care of

my colleague, Dr. Maclean, who kindly allowed me to examine the urine. An immense abscess occupied the whole of the right lobe, leaving only a very narrow margin of liver compressed by a tolerably thick cyst. The left lobe also contained at the time of death (three months and a half after my analysis) many abscesses, but some of these might have formed subsequent to my examination. The liver was punctured with the exhausting syringe several times, and altogether more than 600 ounces of pus were drawn off, and it is certain that a large portion of liver substance was destroyed. After every operation he rallied wonderfully, and his appetite improved. During six days, (three months and a half before his death, and when of course there was more secreting liver substance than later,) the urine was collected carefully and analysed. The daily nitrogen of his food was not entirely determined by analysis, but was determined chiefly by calculation. After making a most liberal allowance for excess of calculation, the daily nitrogen cannot be put lower than 192 grains; in fact, it must have been considerably more than this, but I have erred on the safe side. In six days he certainly received 1152 grains of nitrogen. He passed by the urine, as determined by burning with soda lime, during the six days 792 grains, leaving 340, or nearly 43 per cent. to be accounted for. He had no diarrhœa, and allowing him the healthy bowel excretion of nearly 25 grains daily, which would really only be given by a much larger diet, in six days only 130 grains would thus pass out, leaving still 210

grains to be accounted for. He was also feverish, (temperature 100° at night,) which ought to have increased the urea. Considering how completely the exit covers the entrance in health, the retention of 210 grains of nitrogen in six days shows either that the growing pus-cells appropriated nitrogen, or that the interruption to the proper action of the liver-cells hindered the formation of urea. The latter seems more probable, because subsequently after several operations, when the liver-cells and vessels would be much less compressed, and therefore for the time would be able to act, the urea increased in quantity considerably, though after each operation there was no doubt a still more rapid growth of pus-cells.

‘It seems then that the inference drawn from the comparison of the entering and out-flowing nitrogen, and from the facts of elimination during exercise—viz., that it is in the gland cells that the albumen is transformed into urea, has strong direct evidence in its favour; and we may, I think, fairly conclude that the liver stands in the first rank as an agent of this, and that the splenic and blood cells, and perhaps other glandular bodies, act in the same way, though naturally in a less marked degree.’

On these facts, and the inferences they justify, Dr. Parkes brings forward some suggestions which may be expected to become practically useful; but on this and other points connected with these highly interesting lectures the reader is referred to the lectures themselves, pregnant as they are with practical sug-

gestions, and having a special value for those engaged in practice in India.

The facts connected with the formation of urea in the human system, and its elimination, are particularly interesting in connection with hepatic disease ; and from them, and a consideration of all the points connected with the case of hepatic abscess above related, we can understand how the special action of the chloride of ammonium, so marked and characteristic in primary acute hepatitis and congestion of the liver, is but slightly marked or altogether absent in cases of abscess : the destruction of the greater part of the liver tissue in the case of a large abscess, and the compression of the vessels and cells of the remaining portion, putting a stop to its functional activity and preventing the special action of the medicine while such pressure remains unrelieved.

But as chloride of ammonium possesses the property of increasing the quantity of urea in the urine, aiding in its formation and elimination by the kidneys under ordinary circumstances ; so, in hepatic abscess, when the functions of the liver, (or what remains of it,) are in great part, or entirely in abeyance, is it not probable that it then operates by bringing about vicarious action in all the other immense glandular and cellular structures distributed throughout the system, causing in them increased transformation of the physically altered albumen, the waste of the tissues, which owing to the febrile state suffer rapid disintegration, and its elimination by the kidneys, and

probably also by the glandulæ of the skin as a result of its powerful diaphoretic action?

The cases which follow are given in full from the daily reports, so as to illustrate the special symptoms caused by the medicine. In Case VII. a peculiar subjective phenomenon was experienced not unlike the epileptic aura. Dr. Elliotson speaks of a patient who had two auræ, commencing on the dorsum of each foot, and running up the legs and thighs to the trunk, where they broke into five streams, all of which again met at the epigastrium. The sensations experienced by my patient travelled in a reverse direction, breaking off on the first occasion into two streams; but instead of serious nervous disturbance ushered in perspiration and relief of pain only. Sensations of cold, or as if cold water were trickling over the right hypochondrium, are sometimes felt to precede the heat and perspiration caused by the medicine; but in this case the symptoms were peculiar and appear worthy of special mention.

CASE VI.—Congestion of the Liver—simple enlargement—illustrating some of the special symptoms produced by the Chloride of Ammonium in Hyperæmia of the Liver.

Private W. S., a stout, well-made man, of plethoric habit, was admitted on September 12, 1871, with febricula, the result of drinking to excess for some days previously. He complained of severe frontal headache, and his face was flushed.

Diaphoretic mixture was prescribed, and on the 16th he was free from fever, but still complained of headache. He did not complain of hepatic symptoms, as soldiers seldom do

until seriously ill (or unless specially questioned on the subject); but according to custom I made an examination of the hepatic region, and interrogated him as to the symptoms of hepatic derangement, which I suspected. He stated that, for the past eight or nine months, he had suffered from a dull heavy pain in the right side, (hypochondrium,) aggravated by lying on the right side; he could not lie on the left side owing to a sensation of weight and dragging in that position; latterly, headache, loss of appetite, bitter taste in the mouth, and despondency accompanied the above symptoms, and the pain of the side was aggravated by wearing his belts.

There was fullness of the right side in the hepatic region, and some tenderness on pressure beneath the margins of the false ribs. The right lobe was enlarged upwards; there were swelling and tenderness in the epigastrium, where there was increased area of hepatic dullness. There being no fever, and the skin acting properly, he was ordered twenty grains of chloride of ammonium thrice daily, and was desired to note its effects from the moment of swallowing the dose, so as to inform me of the same at the next visit. Beef-tea diet was ordered.

September 17.—He stated that, about ten or twelve minutes after taking the first dose of the medicine, a sensation of pricking ('pins and needles') and 'pulling' was experienced beneath the tenth rib of the right side, (the point, as shown by the patient, was a little to the inner side of a line let fall from the right nipple;) the pulling was towards the spine. At the same time, he experienced the sensation of rapid shocks, proceeding from a point where the pulling was felt to a point as high as the seventh rib. The patient believed these shocks passed through the liver.

The medicine also produced general heat of surface and perspiration in the usual manner. The patient now felt much lighter and easier; the headache was removed, and he was able to turn on his left side without uneasiness or sense of dragging. After the second dose, he felt a 'prick-

ing and tingling' in the part where the 'pulling' was felt after the first dose; from this it extended all over the left side of the abdomen, but was more acute on the right side; it lasted a few seconds, when a perspiration broke out all over him, and he says he never sweated so much in his life before; he perspired from 'head to feet,' and after the perspiration he felt light, and refreshed, and a genial heat remained in the right hypochondrium and in the right side of the abdomen for the rest of the evening. The urine was not diminished. He was now entirely free from uneasiness and tenderness in the hepatic region, and the swelling in the epigastrium had subsided. Chloride of ammonium was given, in fifteen-grain doses, thrice daily.

September 18.—There was no enlargement of the liver; no pain or tenderness. He was able to lie on either side, for any length of time, without uneasiness; his appetite was much improved; his headache was gone. He was discharged from hospital fit for duty, but was ordered to take the medicine in five-grain doses a few days longer.

CASE VII.—*Simple Enlargement of the Liver, illustrating some of the more unusual special symptoms produced by the Chloride of Ammonium in Hepatic Disease.*

Lance-corporal I. K., a stout plethoric man, of fairly temperate habits, was admitted to hospital on September 23, 1871, complaining of fulness and sense of distension in the epigastrium, and pain and uneasiness about half-an-hour after taking food. During his service in various parts of India and Burmah had nine admissions to hospital with dysentery, three hepatitis, three hæmorrhoids, and several times with dyspepsia. For three months or so previous to admission he suffered from dyspepsia, morning sickness, and vomiting, and used frequently to vomit his food after taking meals; complained also of sensation of 'smothering' when lying on his left side—the easiest position being on the back. The skin was cool; pulse quiet.

On examination, considerable fulness was perceptible in the epigastric region, where there were also tenderness on pressure and increased area of hepatic dulness. He was ordered twenty grains of chloride of ammonium twice daily. Beef-tea diet was prescribed, and one pint of milk and one pint of corn flour.

September 24.—He stated that, from two to three minutes after the dose of the medicine yesterday evening, a sensation of 'two cold narrow streaks' started off right and left from the tip of the ensiform cartilage, and coursed along the margin of the false ribs on either side, until they reached a point about an inch outside of lines let fall from the nipples. Thence 'the cold streaks' extended down the thighs in the central line as far as the centre of each patella. The sensation of cold moved along about as quickly as a painter would draw his brush in graining; and when the knees were reached, the legs beyond became hot and broke out in perspiration, which thence extended all over the body; the perspiration was profuse, and lasted about an hour. After this, the sensation of weight and suffocation, which formerly prevented his lying on his left side, was greatly relieved. The treatment and diet were continued.

September 25.—Yesterday, a few minutes after taking the morning dose, a 'cold streak,' (this time single and of greater breadth,) spread over the left side of the abdomen as far down as the pubis, and afterwards all over the abdomen. The perspiration which followed was not so great as before. He could now lie on his left side with ease, but he was cautioned against doing so. The medicine and diet were continued.

September 26.—The medicine yesterday was only followed by a sensation of cold, this time stopping just halfway between umbilicus and pubis.

September 27.—The medicine had now no sensible effect. The enlargement in the epigastric region was gone. The

chloride of ammonium was now prescribed in eight-grain doses thrice daily.

September 29.—Patient was discharged well.

Case VIII. furnishes an illustration of what may be called *medicine diagnosis*. The patient sought admission to hospital with frontal headache, and feverishness, attributable to exposure to the sun, for which the salt was prescribed; and its special and characteristic action on the liver being manifested, led to the detection of the hepatic congestion.

CASE VIII.—*Simple Enlargement of the Liver—Congestion treated with, and in the first instance diagnosed by, the exhibition of Chloride of Ammonium.*

Gunner A. W. O., 7-5 Royal Artillery, thirteen years' service in India, was admitted to hospital, Madras, on June 10, 1872, complaining of pain in his head, accompanied by giddiness, and at times dimness of sight; he complained also of loss of appetite, and sleeplessness at night. A few days before admission he had been exposed to the sun on duty, to which circumstance he attributed his illness. The bowels were regular; there was slight feverishness; skin dry; tongue clean. He was ordered an ounce of diaphoretic mixture every third hour.

June 11.—He still complained of frontal headache, the pain shooting through his temples; the skin was warm and moist; secretions regular. Patient was ordered twenty grains of chloride of ammonium twice daily. In persistent headache, after other means fail, I find a few doses of chloride of ammonium sometimes effectually removes it.

June 12.—He stated that, about half-an-hour after taking the first dose of the medicine, he felt a peculiar 'creeping' sensation at the pit of the stomach, and about

twenty minutes afterwards a 'rushing' sensation to the right side, in the region of the liver, took place, which then darted to the head; afterwards the pain left his head and did not return; soon after a profuse perspiration broke out over the entire surface.

On examination, I found the liver enlarged in all directions; hepatic dulness extending upwards in the right mammary line beyond its natural limits, and downwards in the same line for an inch and a-half beneath the right costal arch. On directing the patient to lie on his left side he was sensible of a 'weight' or dragging sensation in the right hypochondrium, although he had not noticed this symptom before. He felt no inconvenience on his back or on lying on his right side. Pulse 68; temperature normal; respiration 20. The medicine was continued.

June 13.—No return of the headache. Feels less 'dragging' in the right side when he turns on the left. Bowels regular; tongue clean; slight pyrexia. Pulse 76; temperature 100·5°; respiration 24. Continue medicine.

June 14.—The liver enlargement was much reduced; the anterior margin of the liver extended only half-an-inch beneath the right costal arch. He felt no weight or dragging on lying on his left side; could lie in any position with ease. Passed a large quantity of urine yesterday. Medicine now only produced a sensation of warmth in the epigastrium, followed by slight perspiration. Chloride of ammonium was ordered in ten-grain doses twice daily. He remained in hospital, taking the medicine, in small doses in bitter infusion, till the 18th, when he was discharged quite well.

CASE IX.—Chronic Enlargement of Liver treated with Chloride of Ammonium; special symptoms of the drug—reduction of liver enlargement.

Private W. P.—Eight years in India, sallow, anæmic, and emaciated, was admitted to hospital on September 11, 1871, complaining of debility, loss of appetite, and uneasy

sensation in the epigastrium after food. These symptoms had been present for a long time previous to admission. In 1865, in Bellary, was in hospital with hepatitis. As is commonly the case with soldiers, the patient only complained of the above symptoms, those most obvious to him, making no mention of pain or other uneasiness in the hepatic region; but on interrogating him as to the existence of pain, sense of weight, or tenderness in the right hypochondrium, and on examination, there was ample evidence of hepatic disease to account for the state of his health. The area of hepatic dulness was much increased; the lower margin of the liver was found to extend about two inches beneath the margins of right false ribs in front, and there was tenderness on pressure, particularly at a point near the extremity of the eleventh rib. Suffered for some time past from a sense of dragging in hepatic region when lying on left side, and pain on wearing his belts. Pulse weak; skin cool; tongue slightly furred. To have a podophyllin pill. Beef-tea diet, and one pint of beef tea.

September 12.—Pill acted mildly. To have chloride of ammonium, fifteen grains thrice daily; diet as before.

September 13.—States that the medicine yesterday brought on a curious 'working and pulling' in the right hypochondrium after taking it, also sensation of heat followed by perspiration, and relieved the pain in the side. Continue treatment.

September 14.—Yesterday, after a dose of the medicine, 'a lump arose at the chief seat of tenderness' (near the point of the eleventh rib) 'about the size of a walnut and seemed to burst of a sudden.' Since then has had no pain, but there is still some tenderness on pressure. Continue treatment.

September 15.—Health improved, hepatic pain and tenderness gone. Medicine does not now cause perspiration, but the urine is passed in increased quantity and more frequently.

September 20.—Since last report doing well. Liver

enlargement much reduced. To have six minims of tincture of perchloride of iron with eight grains of chloride of ammonium thrice daily.

On September 29 he was allowed to get up and go about the ward; he was, however, still anæmic and weak—the conjoined effects of his recent disease and long service in a tropical and malarious climate.

He was discharged on October 19 with health much improved and liver enlargement gone.

We search in vain in medical literature for any mention of the symptoms, characteristic and special, induced by the ammonium chloride in hyperœmia of the liver. The brilliant results following its use in congestion of the liver could scarcely have been inferred from what has been said of its physiological properties. In one work it is described as a general stimulant; in another as a sedative to the heart's action; in a third as a diaphoretic; in a fourth as a laxative; while by some it is considered a cholagogue.¹

From a consideration of the above circumstances, coupled with the fact that, in the numerous instances in which I have used it, either as an experiment in health, or as a remedy in diseases other than liver congestion, in which it has been either without sensible effects, or, if any, these have been but slight and not characteristic, I am led to the conclusion that the medicine has not only a specific elective action, but that its characteristic and sensible action being manifested in any given obscure case may be considered as *diagnostic* of hepatic disease.

¹ See Appendix, p. 82.

CHAPTER IV.

RECAPITULATION OF THE TREATMENT—SOME IMPORTANT POINTS
 CONCERNING THE NURSING AND MANAGEMENT OF PATIENTS
 SUFFERING FROM HEPATIC DISEASE—ABSCESS OF THE LIVER
 —ILLUSTRATIVE CASES.

Congestion of the Liver.—In congestion (simple enlargement) of the liver the chloride of ammonium should be given in twenty-grain doses, twice or thrice daily, according to circumstances, with careful attention to diet, and rest in bed. The diet should be of the least irritating character, and only small quantities of milk, beef tea, or farinaceous articles should be taken at a time. All rich, fat, or indigestible articles should be interdicted, as well as alcohol, wine, fermented liquors, and spices. Should the patient be feverish, the skin being at the same time hot and *dry*, the medicine should be preceded by a few doses of some simple diaphoretic; diaphoresis, or a moist state of skin, being induced, the chloride should be at once commenced and persistently administered till it no longer produces sensible effects, or till all local uneasiness, hepatic pain, and tenderness have subsided.

Tropical Hepatitis.—In the early stage, should

there be no accompanying diarrhœa, a mild purgative may be administered at the commencement, with a view of clearing out the *primæ viæ*.¹ If there be diarrhœa, the patient passing frequent, loose, and bilious motions, a pill composed of mercury pill, gr. ii., with Dover's powder gr. iii., repeated every two hours till four or five have been taken, will be found the most effectual means of checking it without the risk of setting up gastro-intestinal irritation. Afterwards, saline diaphoretics (as liquor ammoniæ acet.), in frequently repeated small doses, should be administered till their action is well established. Fomentations or bran poultices applied to the seat of pain in the right hypochondrium will afford relief, and should be continued as long as they relieve the pain, and repeated from time to time on its recurrence. In some instances the application of six or eight leeches to the chief seat of pain, when this is severe and attended with much tenderness, and the patient is not reduced, may be advisable; but in general even this amount of local depletion is not required.

The diet should at this time consist of arrowroot, sago, milk, and water; barley water may be taken freely, (as a drink, to assist the operation of the diaphoretic,) and afterwards beef tea may be allowed.

Diaphoresis having been freely established, with abatement of the symptoms, local and general, by the above means, the chloride of ammonium should be commenced, and persistently administered in twenty-

¹ See Appendix, pp. 83 and 89.

grain doses, twice or thrice daily, till its characteristic and special action be no longer manifested. On the cessation of its sensible action, should liver enlargement, with feeling of stiffness, weight, or other uneasiness continue, it may be administered in smaller doses, (five to ten grains,) thrice daily, for some time afterwards, with beneficial results.

During the whole of this time the patient should be kept in bed, for it must be borne in mind that the condition of an inflamed liver is not unlike that of an inflamed joint, demanding strict quiescence in the recumbent posture; and therefore a steady and intelligent attendant should constantly wait on the patient in all acute and severe cases, and the bed-pan and urinal should at all times be at hand, so that the patient may not have the least occasion to quit his bed. It must also be borne in mind, as pointed out by Morehead, that the *complete restoration* of the inflamed portion or portions of the liver is not coincident with the cessation of febrile symptoms and local sense of pain, and symptoms referable to the affected part; in fact, recovery must be considered incomplete till several days have elapsed from the cessation of the pain and febrile disturbance, during which time the patient should be *still* confined to his bed and carefully watched, so as to guard against relapse. By these means, in the majority of cases, a speedy and effectual cure by resolution will be effected.

Abscess of the Liver.—In military practice, however, it frequently happens that hepatitis does not

come under treatment till the peculiar symptoms pointing to abscess, either impending or already formed, are manifested; or it may occasionally happen that, in consequence of bad diathesis, advanced stage, or other cause, recovery by resolution does not take place under treatment, suppuration occurs, and hepatic abscess is formed. It is necessary to detect this event promptly, because it calls for a line of treatment different from that of the antecedent stage. The diet should now consist of light puddings, broths, or animal jellies, and wine may be cautiously administered, if it does not excite the pulse or produce irritation of the gastro-intestinal surfaces;¹ but *no solid food should be allowed*.

If the hectic fever arising at this stage of the disease be attended with colliquative sweating, the chloride of ammonium should be given in twenty-grain doses, twice or thrice daily, and persistently administered till it no longer produces sensible action, and all symptoms of hectic have disappeared; and during convalescence, and when hepatic pain and uneasiness have completely subsided, it may be given in small doses for some time longer. Should the irritative or hectic fever be attended with a *hot* and *dry* state of the skin, the preliminary treatment recommended in the early stage of acute hepatitis should be had recourse to. A moist state of the skin having been induced, no time should be lost in commencing the administration of the chloride of ammonium, as before directed.²

¹ See Appendix, p. 84.

² See Appendix, p. 89.

In primary acute hepatitis, rest in bed and strict quiescence in the recumbent posture are absolutely necessary for the perfect and speedy recovery of the patient; but when abscess of the liver has resulted, the patient who is permitted to leave his bed, or even move about in bed, is exposed to a greater danger than the mere recrudescence of inflammatory action, which inevitably results from inattention to this important rule. He runs the risk of rupturing the wall of the abscess (which may be making its way by one of the usual channels) before adhesive inflammation has taken place between the opposite surfaces of the peritoneum—an occurrence which would inevitably lead to a fatal result.¹

Chronic Enlargement of Liver from long residence in India and repeated attacks of congestion is benefited, and the liver enlargement reduced in a remarkable manner by the administration of chloride of ammonium in doses of gr. 10 to 20, twice or thrice daily, according to the principles already laid down, varied, of course, according to circumstances in individual cases.

'*Torpor of Liver*' and functional derangements, attended by lithœmia (Murchison), associated with congestion of the liver, want of sleep, and depression of spirits, are benefited in a remarkable manner by a course of the medicine with careful attention to diet and regimen. In such cases I have known a few twenty-grain doses of the salt remove the symptoms of disordered liver, restore sleep, and revive the

¹ See Appendix, p. 84.

drooping spirits after the complete failure of other remedies.

The cases hitherto given were selected with the view of illustrating the method of treatment of congestion of the liver and acute hepatitis, and as typical illustrations of the characteristic and special symptoms produced by the medicine, in the more acute and favourable forms of hepatic disease. It would be unreasonable, however, to look for the same speedy relief from pain, and general improvement in all the symptoms during its use, in every instance, without reference to the stage of the disease in which it is administered, the temperament of the patient, the diathesis, or the existence of the various cachexiæ, as well as the complication of other diseases.

In the event of abscess of the liver having existed for some time previous to the commencement of the treatment—a circumstance of by no means infrequent occurrence in military practice—from the patient not having sought admission to hospital till that event had taken place, or from the disease having been overlooked in its early stages through mistaken diagnosis, or from other causes, and when the patient is reduced and suffering from irritative or hectic fever, with much prostration of the vital powers, the medicine does not *at once* exercise the well-marked characteristic and sensible action displayed in more acute and favourable cases. In such instances it may be necessary to administer the salt in doses of twenty grains twice or thrice daily for a considerable period, varying from six to ten days, before any

great change is observed in the condition of the patient. But, sooner or later, if the medicine be regularly given, with strict attention to the rules for diet, nursing, and regimen, the previously lurid, sallow, or dusky and anxious countenance will give place to one clear, bright, and hopeful; the appetite and sleep will return, with alleviation of all the symptoms; the hectic fever, which may have been from time to time of a remittent or continued type, will at length yield; and the patient will regain flesh and colour after the slow and progressive emaciation from which he had previously suffered. In most cases occurring in my own practice where abscess existed from the first, or in cases of hepatitis in patients who had suffered from previous attacks, or were cachectic from long residence in the plains, malaria or other morbid agency, I have found from *four to ten days* are required before any marked change is observed under the persistent administration of the medicine, during which time a feeling of comfort and free diaphoresis—probably with diuresis also—may be the only marked effects produced. (See Case XII. page 63.)

The perspiration induced by the medicine, unlike the colliquative sweating in hectic, is not attended with depression, but, on the contrary, brings relief, and is probably one of the channels through which it acts as a depurant, by the elimination of morbid materials from the circulation, (the product of the rapid waste of the tissues,) which are poured into the circulation more rapidly than they can be eliminated

by the different emunctories, and thus accumulating become a source of irritation to the vascular and nervous systems, and by the reaction thereby induced lead to congestions and lesions of the various viscera.

In abscess of the liver under such circumstances, if the patient be not thus relieved by freeing the blood from impurities through the various emunctories, while the nervous and vascular systems are stimulated to increased energy so as to equalise the circulation and sustain the vital powers—thereby relieving or preventing congestion of the liver or other important organs, and allaying local and general irritation—death will take place in four cases out of five from hectic fever and slow exhaustion; or dysentery may supervene and he sinks suddenly overpowered from this serious complication super-added to the original disease.

I have deemed it necessary to enter into the above particulars because I have reason to think that the free diaphoresis produced by the medicine has led to its abandonment in hepatic abscess by some practitioners through fear that the exhaustion which I have spoken of above as the result of the disease going on unchecked, may have been *occasioned by its action*, and because *no apparent benefit* may have resulted for *some days* during its use.

The following case of abscess of the liver is interesting in several respects, but chiefly because it was the first and only instance, (among the total of 153 consecutive cases of hepatic disease shown in

Table II., page 78, as successfully treated with chloride of ammonium,) in which dysentery was a secondary complication; and its occurrence in this instance was, in all probability, owing to the disease going on unchecked for six days after admission to hospital.

Dr. Budd, in his work on disease of the liver, records a similar case in his practice, where an abscess of the liver was mistaken for gastritis, and the existence of the abscess was only revealed by post-mortem examination. That like mistakes are not of infrequent occurrence a considerable experience in Indian practice has satisfied me. In some stations, as Secunderabad, Deccan, dysentery is a much more frequent complication of hepatic disease than in others; and a perusal of the casualty reports of that station would disclose the fact that many of the deaths returned from dysentery have had for their remote cause abscess, or other disease of the liver, which was masked by the severity of the dysenteric symptoms, the patient perhaps never having complained of liver symptoms at all. Hence the necessity for a careful examination of the hepatic region in all cases of dysentery, so as to discover if there be any liver enlargement, tenderness on pressure in that region, or pain on taking a deep inspiration, or lying on either side. Case X. shows the necessity of a careful examination to prevent hepatitis or abscess of the liver being confounded with gastritis or other abdominal affection.

In cases of fever too, (on their first presenting themselves as well as daily subsequently,) careful

examination is necessary for the detection of hepatic complication; and care must be taken not to confound fever, which is idiopathic, and which may be either of an intermittent, remittent, or continued type, with that which is merely secondary and symptomatic of hepatitis. Were this the place to do so I could give several instances of mistaken diagnosis coming under my observation, in which the symptomatic fever of hepatitis was mistaken for ordinary intermittent, remittent, or continued fever, to the entire neglect of the local lesion of which it was only a symptom—the patient, perhaps, never having complained of liver symptoms at all. And so, in dysentery, I have known hepatic complication terminate in abscess and the death of the patient without the true nature of the disease being suspected during life, because no strict and searching examination had been made, *the patient never having complained of hepatic symptoms.*

In the treatment of hepatic disease coexistent with or secondary to acute dysentery, I have no experience with chloride of ammonium. I have found it effect a cure in some *chronic* cases of dysentery, (after the failure of ipecacuanha,) in which liver complication was discovered by examination, but not complained of by the patient. But in the more acute and serious cases of the disease, such as I have witnessed at Secunderabad, Deccan, (and which in many instances, whether complicated or not, proved rapidly fatal in spite of ipecacuanha and every other treatment,) I have no personal experience to offer. I

would, however, in the event of again meeting with such, be inclined to try a mixed treatment of alternately given ipecacuanha, (dose from twenty to thirty grains,) and chloride of ammonium until the relief of the dysentery; or a full midday dose of the ipecacuanha, or the latter in enemata should there be fear of vomiting, with morning and evening dose of the chloride as in Case X.

CASE X.—Hepatitis, resulting in abscess; its early symptoms simulating Gastritis; secondary Dysentery; recovery. Treatment, Chloride of Ammonium.

Private W. W— was admitted to hospital on June 25, 1870; complained of severe pain in the epigastrium extending into the left hypochondrium, increased on pressure or a full inspiration. There was considerable pyrexia, frequent pulse, and much irritability of stomach, with persistent vomiting. The bowels were relaxed and the tongue was coated with a white fur. The patient had been employed as a waiter in the canteen previous to admission, and had been drinking freely for some time past.

Effervescing draughts with anodynes were prescribed, and a bran poultice was applied to the seat of pain. The gastric symptoms above described occurring in the case of a man who had been drinking hard for some time previous to admission, and who was then suffering from 'Ebriositas,' all combined to mislead one of my colleagues as to the true nature of the disease in the first instance; and exhaustion seemed rapidly following on the persistent irritability of stomach and vomiting.

On June 30, (the sixth day from admission,) the true nature of the disease having been recognised, I was requested to take charge of the case, with a view to the chloride of ammonium treatment being fully carried out under my immediate care.

The general symptoms previously described were then but slightly abated; there was pyrexia accompanied by cold clammy perspiration; pulse 110; morning temperature 102° , evening 103° ; as the skin was acting freely, chloride of ammonium was at once ordered in doses of twenty grains, twice daily, and bran poultices to the side. Beef-tea diet; ice, a small piece to be sucked occasionally, and two extra pints of beef tea. A bed-pan and urinal were provided and patient ordered *on no account to quit his bed*.

On July 1 it is noted—Medicine acted characteristically, affording great relief to pain; shortly after the first dose patient fell asleep, and awoke much refreshed. The left lobe of the liver was found to extend into the left hypochondrium to a point corresponding with the junction of cartilage and body of the seventh rib; thence the lower margin of hepatic dulness extended in a curved line downwards, inwards, and across to the tenth rib on right side; the lowest part of the curve reaching to within two inches of the umbilicus. The liver was also much enlarged upwards, the upper margin of hepatic dulness extending in the right mammary line as high as the interspace between the third and fourth ribs. Pulse, morning 104; evening 112; morning temperature 102.5° , evening 103° . The treatment was continued, and after an anodyne draught patient slept some during the night.

On the 2nd he felt exhausted; his countenance was anxious; there was hectic fever with evening exacerbation; pulse small and quick, in the morning 110, evening 114. Temperature, morning 103° , evening 103.5° . The tongue was dry and coated with a dark brown fur; bowels relaxed; motions bilious; appetite much impaired.

The slightest pressure was intolerable over the epigastrium, where there was a distinct prominence. In the morning he was slightly delirious, and complained of headache; the skin was at the same time hot and dry; the morning dose of ammon. chloride was accordingly omitted, and a mercury pill with Dover's powder was given to check purging and

alter the secretions, and liquor ammon. acet. with tinct. hyoscyam. to re-establish the action of the skin and prepare it for the action of the chloride of ammonium. The pills had the desired effect, but the fever with parched skin continued.

Visited at 10 P.M., when there was much fever with delirium and prostration. Was ordered some wine, to be mixed with water, and a little given at frequent intervals when awake during the night. He slept some during the night, and on the 3rd felt much better; anxiety of countenance gone, and patient appeared somewhat lively; pulse small, slow, and regular—110. Morning and evening temperature 101.5°. He was now ordered twenty grains of chloride of ammonium, thrice daily, and anodyne draught at bed-time; and should the skin at any time become dry, the liquor ammon. acet. draught between the doses of the chloride. Diet as before, with two pints of milk and six ounces of port wine.

On July 4 he felt better and was inclined to sleep; the pain of side was much abated, and the tumour in the epigastrium was considerably diminished; bowels were quiet; there was no anxiety of countenance, but perhaps this was slightly masked by the congestion and fulness of face which still continued—the result of pressure upwards, and encroachment on the right lung by the enlarged liver. The tongue was moist and cleaning at the edges, a dark brown and rough fur occupying the centre. There was evening exacerbation of fever. Temperature, morning 101.5°, evening 102°; pulse, morning 102, evening 104. Treatment continued.

On the 5th, the fulness and tenderness of right side of chest and abdomen were much reduced, and considerable pressure could be borne here and over the tumefaction in the epigastrium, where before the least pressure caused severe pain. Patient felt and looked much better. The hepatic dulness now only extended as high as the fourth rib, and the lower margin of the liver had receded to a point

about half an inch higher than on first examination; respiration, at first quick and laboured, was accordingly easier. The pulse was 98; morning temperature 101.5° , evening 101° . From the above date to the 10th, patient continued much in the same state, with the exception of dysenteric symptoms necessitating the omission of an occasional dose of the chloride, from time to time, so as to admit of the administration of ipecacuanha for the dysentery. The diet was at the same time changed, and tea diet, with three pints of beef tea simmered down to two, substituted, with barley water as a drink; the wine was continued. Fearing that the administration of ipecacuanha by the mouth might induce vomiting, and thereby endanger the process of repair going on in the liver or adjoining parts, enemata of ipecac. in large doses, containing a few drops of tinct. opii, were administered, with but little benefit, and patient continued to pass dysenteric motions up to the 14th. The dejections were foetid and frequent, as many as seven or eight in the 24 hours.

On the 14th, dysentery persisting, and patient's state becoming every moment more critical, thirty grains of ipecac. were given by the mouth after the application of a sinapism to the epigastrium and sedative draught to reduce as far as possible the risk of vomiting. The temperature had now fallen to 97° in the morning, the evening temperature was 99° . Pulse, morning 78, evening 94. On the 15th he was reported to have slept well during the night; bowels had not been moved since 7 P.M. the previous day. The ipecac. was retained without discomfort, and acted like a charm; the tongue commenced to clean; the tumour in the epigastrium was very much diminished; and the margin of the liver was found to extend but one inch and a half beneath the margins of right inferior ribs, and but little below the normal situation in the epigastrium. From this date patient gradually and steadily improved. On July 30 the temperature was normal, and patient was, *for the first time, permitted to sit up* for a short period during the day; and

after a few days he was *permitted* to move gently about the ward.

On September 3, having steadily improved, but being still feeble, he was allowed to take gentle exercise in the open air on foot; as it is found that the shaking experienced in the ordinary hospital sick cart or dhooly is injurious, and likely to again light up mischief in the lately affected and tender parts, or retard recovery.

On September 21 he was discharged, having gained rapidly in weight; but he continued weak, owing in part to the debilitating nature of the Rangoon climate in the rainy season. On discharge there was no abnormal hepatic dullness, and patient could take a deep inspiration and bear pressure over the hepatic region without pain or uneasiness. He was sent afterwards with the invalids of the season for change of air to England.

Case XI. illustrates the symptoms and course of suppurative inflammation of the liver in a cachectic individual, of fair hair and complexion. In this instance, as is frequently seen in such cases, the earlier acute symptoms were allayed by the treatment, and there was abatement of the liver congestion. The recurrence of liver enlargement, pain and tenderness, with the accession of distinct rigors shortly after, pointed unmistakably to the formation of abscess,—the bad health, and the diathesis and temperament of the patient, having favoured the effusion of the corpuscular or aplastic variety of lymph.

It may be inferred that in this case the effect of the treatment was, in the first instance, to confine the diseased process to the narrowest possible limits, by removing congestion, and bringing about a healthy capillary circulation in the vicinity of the morbid

process, and in this manner, and by the improvement of the constitutional state, ultimately effecting the absorption of the purulent effusion.

In the above, and in similar cases, in which the existence of abscess has been undoubted, and in which the swelling, fluctuating it may be, as in Case XII., gradually lessens, and finally disappears without any appreciable discharge, it may be inferred that the disappearance of the abscess has been effected by a process of absorption, as Rokitansky, Morehead, and others have pointed out—the first step in the process being a good circulation in the tissues around, then absorption of the liquor puris, shrivelling and breaking up of the corpuscles into their constituent granules, an encysted putty-like residuum being left. Again, recent researches have shown that insoluble and solid substances are capable of being absorbed, both from the abdominal cavity and from the subcutaneous connective tissue, into the circulation. In order to gain entrance into the veins they traverse the lymphatic vascular system; but it is not yet accurately ascertained whether they enter the circulation exclusively by this route. It has been shown that particles of charcoal, molecules of mercury, starch corpuscles, &c., &c., can thus find their way into the circulation, and we can easily conceive pus or its débris being similarly removed from an abscess cavity in the liver; just as is seen in its absorption in subcutaneous abscess, in hypopyon, and in synovitis, in which latter pus corpuscles are said to be contained in the effused fluid. Or, if it be true, as be-

lieved by M. Guillot and Dr. Schmit, that a natural communication exists between the biliary ducts and the deep-seated lymphatics of the liver, a more direct route for the pus-removal may be imagined as not altogether improbable.

CASE XI.—*Hepatitis—Abscess of the Liver—Recovery.*

Private W. J., of fair hair and complexion, sanguine temperament, scrofulous diathesis and syphilitic cachexy, was admitted to hospital, 2-21 Fusiliers, at Thayetmyo, on July 8, 1871, complaining of epigastric pain and tenderness, pain of right shoulder, loss of appetite, and debility. In 1864 contracted primary syphilis in Bellary, and in 1866 was invalided to England from Secunderabad for secondary syphilis—copper-coloured eruption over the body—afterwards pain in all the joints which completely crippled him. For two months previous to admission felt weak and out of sorts; his appetite failed, and he had a pain in the right shoulder which was increased on exercise or walking. For the fortnight or so previous to admission experienced, from time to time, a darting pain in front beneath the right false ribs, and towards evening flushes of heat were experienced. Three days before admission the pain of side suddenly ‘struck’ him with great severity, and became constant, as also the pain in right shoulder.

On admission there was but little enlargement of the liver indicated by percussion. There was extreme tenderness on pressure over the epigastrium and beneath the margins of right false ribs. The skin was cool, and the pulse quiet and infrequent. Decubitus dorsal; patient unable to lie on either side or take a full inspiration.

Diaphoretic mixture was prescribed, and fomentations to the seat of pain in the side; and on the evening of the 9th, the skin being cool and moist, chloride of ammonium was commenced in doses of twenty grains. The medicine acted

characteristically. Half an hour after taking the dose, a sensation of pricking and darting, 'pins and needles,' was felt to commence at the chief seat of pain and most tender part beneath the right false ribs in front, running along the margins of ribs to the last rib; this sensation lasted a few minutes, after which a 'pulling' commenced beneath the ribs in the right hypochondrium, which also lasted a few minutes, and on its cessation the pain left his side for nearly six hours, (from half-past 4 till 10 P.M.,) when it returned to its original seat, but with diminished severity. The medicine also acted in the usual manner by bringing about diaphoresis and diuresis, and exhilarating the patient. Tea diet; one pint of beef tea and two pints of corn-flour. On the 13th the tenderness of side was much less, and the margin of the liver was now found on percussion to extend about half an inch beneath the false ribs; tongue slightly furred; pulse quiet and regular. Continue treatment; tea diet, two pints of beef tea and one pint of milk.

On the 15th, he was progressing favourably, and considerable pressure could be borne beneath the false ribs of right side and over the epigastrium. On the 20th, the lower margin of the liver had receded beneath the costal arch, and there was no tenderness except on considerable pressure in that situation. Pain gone. Ammon. chlor. fifteen grains thrice daily; diet as before.

On the 25th, as the tenderness on pressure had returned, with other suspicious circumstances, in the case of a patient broken down and of fair hair and complexion, a measurement was taken of both sides of the chest at the level of the ensiform cartilage; the right side measured $17\frac{1}{2}$ inches, the left $16\frac{1}{2}$ inches—normal, perhaps, the patient being right-handed. Patient was ordered four ounces of wine on the 23rd.

On the 26th it was noted—'There is a suspicion in this case that deep-seated abscess is at the bottom of the negative symptoms, which at first and all through have characterised it' (the infrequent pulse, clean tongue, &c.) 'The patient is a light-haired and fair-complexioned man, and of the tem-

perament in which such cases are apt to occur.' Continue treatment; beef-tea diet and extras as before, with six ounces of port wine, diluted with water, to last twenty-four hours.

On the 28th, the patient was worse; he looked anxious and disheartened, and his eyes became suffused with tears when spoken to as to his symptoms. The pain had since its return become fixed and was more severe in one spot, about an inch and half beneath the false ribs, in the right mammary line, where there was extreme tenderness on pressure.

About 3 P.M. this day was seized with severe pain between tenth and eleventh ribs of right side, and near the extremity of the latter rib. *The pain was followed by a chill* which lasted ten minutes, after which patient fell into a cold clammy perspiration. About 10 P.M. had another chill, which ended similarly.

On the 29th, the right side was measured at the level of the ensiform cartilage, and was found to be 18 inches (half an inch more than on the 25th); left side $16\frac{1}{2}$ (same as before). The liver was also enlarged from above downwards; hepatic dulness, commencing between the fifth and sixth ribs in front, was found to extend three fingers' breadth beneath the right false ribs, and, in the right epigastrium, from two and a half to three inches beneath the point of the ensiform cartilage. Pulse 70, slow and regular; respiration 21; temperature 98.6° ; decubitus dorsal, with head raised on pillows, and right thigh maintained in a semiflexed position to relieve the pain. On the 30th, there was marked prominence (bulging) of the right side of chest in the hepatic region, and tumefaction beneath the margins of right false ribs, and in the epigastrium; the skin was bathed with a cold clammy perspiration; evening temperature 98.9° ; respiration 20; pulse 54. The disease was now changed to abscess of the liver, as the phenomena of the past few days left no room to doubt that event.

The treatment was continued, and an oil draught pre-

scribed as the bowels were confined. Diet and extras as before.

On the 31st, he was ordered twenty grains of the chloride thrice daily. From this time till August 5 patient suffered from hectic fever, with night sweats lasting about half an hour, and succeeding to alternations of heats and chills; the sweating commencing regularly at about 10 P.M. and lasting about half an hour. The extremities were constantly cold, and bedewed with clammy perspiration. The temperature varied during the above period from 97° to 98.8° in the morning, and from 98° to 99.3° in the evening; the pulse varying from 60 to 93. On August 2 the right side had diminished in measurement one quarter inch; and on August 4 the bulging of right ribs over the hepatic region was much diminished, and the fulness beneath right false ribs and in the epigastrium had so far subsided that the margins of the ribs again stood out prominently on both sides, and the feeling of tightness complained of by the patient was relieved. He felt much better, looked more cheerful, and a degree of natural colour was again returning to his countenance. He stated that about half an hour after the midday dose, on the 3rd, the pain shot down from its fixed seat in the side to a point about two inches above the pubis; it then 'ran up and down for about five minutes;' since then the fixed pain in side was much diminished, and pressure could be borne without pain.

On the 5th, the pain of right side and shoulder was gone, and the right thigh, which up to now was carefully retained by patient in a semiflexed position, with pillows beneath the knee joint for a support, could be stretched without pain for a short time, and slight pressure could again be borne over the hepatic region. Hepatic dulness commenced between sixth and seventh ribs in front, and extended to lower margins of right false ribs beneath. Coincident with this improvement the sensible action of the medicine became less marked.

On August 8 the hectic fever was entirely gone, and

there was no pain except on pressure at a point about an inch to the inner side of the extremity of the eleventh rib. On the 9th he was ordered five-grain doses of quinine, as he had slight evening pyrexia, probably owing to the malarious and oppressive state of the air which prevailed at the time.

On the 21st the pain of side and tenderness was completely gone, and patient complained only of slight sense of weight in the hepatic region, when lying on the left side. Chloride of ammonium five grains thrice daily.

On the 23rd he could lie on the left side without uneasiness. From the above date he went on steadily, but slowly, gaining strength and weight; but the rainy season and the close oppressive malarial and humid atmosphere, accompanying the latter part of the rains, was much against his recovery, and he remained in hospital on account of debility till October 30, when he was discharged, having gained about a stone in weight since his convalescence.

Case XII., communicated to me by Dr. J. O'Farrell, A.M.D., is a contribution to the history of the ammonium chloride treatment of hepatic disease of great interest. In this case there is no doubt that hepatic abscess was in existence, and in a state of progression for a considerable time prior to the commencement of the exhibition of the chloride of ammonium. The medicine was commenced on September 22 in doses of twenty grains, thrice daily, and continued till November 12 following. From September 27 till October 8—a period of *eleven* days, and sixteen from its commencement—the patient appeared to be getting worse; the hectic fever increased in severity, and he became much weaker, and finally the abscess pointed between the tenth and eleventh ribs, and ‘*appeared as if it must soon burst.*’

Dr. O'Farrell informs me that this was the first case of hepatic disease in which he tried the chloride of ammonium. His perseverance in the use of the remedy, under the grave circumstances of the case, abstaining from puncturing the abscess at a time when such a procedure would perhaps, under ordinary circumstances, have been deemed the proper course to pursue, met with its due reward in the complete recovery of his patient.¹ I have before stated that, in severe cases of hepatic abscess, no apparent improvement may take place in the condition of the patient for a period, varying from four to eight or ten days after the commencement of the treatment. This case confirms the accuracy of the above observation, and teaches the further lesson that, although the patient may *appear* to get worse after the commencement of the treatment, and may so continue for a considerable period, the medicine must nevertheless be persisted in, and the strictest attention paid to the rules laid down as to the diet and nursing.

CASE XII.—*Abscess of the Liver, which pointed externally between the tenth and eleventh ribs; treated with Chloride of Ammonium; recovery.*

Corporal F. F., of the 66th Regiment, age 21 years, service in India eight months, was sent to this Sanitarium (Ghiznee) on September 2, 1870. He was suffering from simple continued fever, and was very weak and very anæmic. A few days after his arrival here he began to complain of cough, a slight difficulty of breathing, a dull pain in the right hypochondrium, and inability to lie on the left side.

On examination the liver was found to be slightly

¹ See Appendix, p. 87.

enlarged upwards, and there were also tenderness on percussion below the margin of the right false ribs, rigidity of the right rectus abdominis muscle, and defective movements of the lower part of the right side of the chest.

The liver increased rapidly in size until the dulness on percussion extended upwards as high as the right fifth rib; inferiorly the edge of the liver could be felt fully two inches below the last rib, and posteriorly the base of the right lung was compressed. At the same time well-marked symptoms of hectic manifested themselves, the pulse in the evening ranging from 100 to 120, and the temperature in the axilla from 101° to 103° .

On September 27 I observed that the tenth and eleventh ribs were unusually prominent, and close to the angles of these ribs there was, in the intercostal space, a swelling in which I thought I could detect fluctuation. From September 27 until October 8 patient appeared to be getting worse; he became gradually weaker; the hectic fever increased in severity, (the pulse in the evening being rarely less than 120, and often as much as 130, and the temperature ranging from 102° to 104°); the swelling between the tenth and eleventh ribs also gradually increased in size until, on October 8, there was in this situation a well-defined tumour, in which fluctuation could be easily felt, and which appeared as if it must soon burst externally.

About October 15 a change for the better took place; the symptoms of hectic became less severe, and the liver was evidently decreasing in size. This improvement continued; the abscess gradually receded from the surface; the patient no longer suffered from fever at night; his appetite increased, and he began to gain weight rapidly.

On November 23 he was discharged from hospital, and on December 10 he was brought before the invaliding board, and recommended to be sent to England for a change of climate, as it was thought inadvisable to expose him to the risk of another attack of hepatitis.

Before he left the Sanitarium on December 13 he was

most carefully examined; the liver was still somewhat enlarged, (in the right lateral region the dulness on percussion extended as high up as the seventh rib, and posteriorly the base of the lung was compressed,); but he had no pain whatever in the right side, and he had been quite free from all symptoms of hectic for more than six weeks, during which period he increased two stones in weight.

The treatment consisted in the administration of the chloride of ammonium in twenty-grain doses thrice daily. He began to take it on September 22 and continued it till November 12.

Careful daily notes were taken of the effect of the medicine. It appeared (as mentioned in Dr. Stewart's pamphlet) to produce a feeling of warmth in the epigastrium, which gradually diffused itself over the entire cutaneous surface, and was followed by diaphoresis, and also to act as a diuretic, but it had little or no effect upon the pain in the side and shoulder.

Several times, when patient was very restless at night, I ordered him half-drachm doses of the hydrate of chloral, with the invariable result of procuring for him three or four hours of calm refreshing sleep.

Case XIII. is an example of hepatic abscess formed at the time of the patient's admission to hospital, as evidenced by the *tout ensemble* of the symptoms, the *physical signs* lending but little aid in the diagnosis. The subsequent escape of pus by rupture of the wall of the abscess, (probably into the transverse colon from an abscess in the left lobe,) confirmed the diagnosis. In two instances, the one here related and another similarly treated, the pus escaped by rupture of the wall of the abscess into the intestinal canal, and in both cases the patients acted contrary to orders—in not keeping their beds and maintaining

the recumbent position. In both instances the abscess burst when the patients were making muscular exertion. It was fortunate for them that adhesion of the walls of the abscesses to the peritoneal covering of the intestines had taken place. Had it been otherwise, (although I had taken every precaution to prevent these men quitting their beds or even sitting up in bed,) I would have had two cures of hepatic abscess less to record, and the patients would have paid for their disregard of my instructions with their lives. The character of the pus was the same in both instances, and differed from any I had before seen either in the alvine discharges or contained in the cavities of hepatic abscesses—it was thick and of the consistence of jelly, as if from absorption of the watery portion.

CASE XIII.—*Abscess of the Liver which probably opened into the Colon.*

J. G——, a weakly delicate man of 11 years' service, in the habit of indulging in the use of spirits, was admitted to hospital on July 11, 1870, complaining of acute pain in the right hypochondrium extending backwards to the loins, and upwards posteriorly to the right scapula. He complained also of a frequent, short, and dry cough. Had been ailing for a month or more previous to admission; during this time he suffered from loss of appetite and debility with pain in right side, and evening chills followed by feverish symptoms.

Owing to his delicate state of health patient was not allowed to proceed to India to join his regiment, but was kept at the depôt the greater part of his service, and only arrived in Burmah in January, 1869.

On admission he was suffering from pyrexia, pulse fre-

quent and feeble, his countenance was pale and anxious, and his eyes were sunken and surrounded with dark areolæ. Decubitus dorsal; unable to lie on either side or take a deep inspiration. There was exquisite tenderness on pressure along the margins of right false ribs, as well as over the epigastrium, where there was some tumefaction, and increase of the normal area of hepatic dulness. The right lobe was but slightly enlarged, as indicated by percussion. Morning temperature 101.5° ; pulse 96; evening temperature 103.5° ; respiration 31.

From admission patient had small and frequent doses of simple diaphoretic mixture with tincture of hyoscyamus, and on the 12th, as the skin was perspiring, he was ordered twenty grains of chloride of ammonium, morning and evening, and hot fomentations to be constantly applied over the seat of pain in right side and epigastrium. An orderly had charge of the patient, and he was provided with a bed-pan and urinal, and ordered to maintain the recumbent position, and on no account to quit his bed. Tea diet; beef tea two pints, and barley water as a drink.

The medicine acted characteristically and relieved the pain, and on the 13th he had improved, but still looked anxious; his respiration was easier, and the short dry cough less troublesome. The morning temperature had fallen to 97.5° , the evening was 102° ; the pulse was 77 in the morning and 90 in the evening. As the patient was weak, and the medicine caused profuse perspiration, the dose was reduced to fifteen grains morning and evening; his diet was changed to spoon with two pints of beef tea and four ounces of wine.

On the 16th he was better; the pain of right side and shoulder was much relieved. The evening temperature 98.5° (morning 98°); pulse 90. On the 17th the temperature, which in the morning was 98° , fell in the evening to 94° , the pulse being 76 and 84 at those periods respectively.

On the morning of the 18th he seemed to be progressing favourably. Temperature 97° ; pulse 75; but at the even-

ing visit he looked very ill, his countenance was anxious and ghastly, his surface bathed with cold clammy perspiration, his pulse very weak. He was ordered, at once, some Extract Carnis and two ounces of port wine. On the 20th the patient was progressing favourably; the temperature had risen to 100.6° in the evening, and his pulse was 80 and fuller. On the 22nd, after taking some food at the dinner meal patient sat up in his bed (contrary to orders) for the purpose of using the urinal. In the act of sitting up he 'felt something crack and give way' towards the left epigastrium, and *immediately afterwards* he passed a small quantity of inspissated pus, of the consistence of jelly—the watery portion of which had evidently been absorbed before the rupture of the abscess (probably into the transverse colon), had taken place. Treatment and diet continued, with four pints of beef tea, and six ounces of wine diluted with water so as to last the twenty-four hours.

From this time to the 27th small quantities of pus were noticed, at times, in the evacuations, which were otherwise natural and regular throughout the course of the disease. On July 31 the hectic fever had left him, and the temperature, pulse and respiration were natural; he was permitted to sit up. Ammonium chloride eight grains thrice daily; low pud. diet and six ounces of wine.

On August 14 he was walking about, and full diet and four ounces of wine were ordered.

On August 28 he was discharged to attend hospital, suffering only from debility, the combined result of climate and his recent serious illness.

In cases of suspected abscess of the liver terminating in recovery without discharge of their contents, and in which the inference to be drawn from clinical observation and experience points to the cure by absorption, it is seldom that an opportunity presents itself of examining after death the morbid

appearances left by the healing of the abscess cavity, and thus confirming the accuracy or otherwise of the diagnosis, which may have been based for the most part on the general symptoms, the physical signs not having been decisive of the event. For this reason the following case is interesting and worthy of being recorded at length. Shortly after the recovery of the patient from the suspected abscess of the liver he went from Rangoon to Poonamallee for change of air, where he remained till after the arrival of the battalion in Madras. The immediate cause of death was heat apoplexy. The notes of the post-mortem examination were made and recorded by Assistant Surgeon F. E. Barrow, 89th Regiment, doing duty with the battalion.

CASE XIV.—*Abscess of the Liver treated with Chloride of Ammonium; recovery; death two years afterwards from heat apoplexy. On examination after death a depressed and puckered cicatrix was found towards the upper and outer surface of the right lobe of the liver.*

Private R. T—, of eleven years and three months' service in India, was admitted into hospital on May 7, 1870, from off guard, doubled up with acute pain of right hypochondrium, extending round to loins, and upwards to top of right shoulder; was unable to stand erect. Surface bedewed with cold perspiration. For the past nine months has suffered pain, from time to time, in right hypochondrium, with accompanying chills at night, pyrexia, and cold sweating. The liver was enlarged, and acute pain was felt at a point between the fifth and sixth ribs, midway from their extremities, aggravated on the slightest pressure. Decubitus dorsal,

unable to lie on either side; tongue slightly furred, moist, broad and flabby, presenting at the sides indentations of the teeth; skin moist; pulse of good volume, 84; urine high coloured. Ordered liquor ammon. acet. dr. ii., with tinct. hyoscyami m. v. in barley water every hour. Six leeches over the seat of pain in right hypochondrium, and afterwards bran poultices, and at 5 P.M. to have twenty grains of chloride of ammonium.

May 8.—The usual characteristic effects followed the exhibition of the medicine yesterday evening, but, (as in the case of Private F——, another case of hepatic abscess at present under treatment,) patient felt a chill and a sensation of cold for some time before the sensation of heat commenced. Patient felt drowsy and fell asleep in about half an hour after the dose, and awoke in an hour or so, as he expressed it, 'light and refreshed, and able to bear the weight of his own body,' which before distressed him. This morning he feels no pain in the recumbent position, and can move slightly in bed without pain; pulse 98; tongue slightly furred. Continue chloride of ammonium in twenty-grain doses twice daily.

May 9.—Is much easier; no pain of side except on a deep inspiration; pulse 100; marked hectic symptoms have been present since yesterday, pointing unmistakably to the existence of abscess of the liver.

May 10.—Yesterday was hot and oppressive, and patient was bathed in perspiration; his pulse was weak and frequent, and he was ordered four ounces of port wine. This morning he is much better; pulse 79, pretty full; countenance cheerful. Perspires much less. Continue medicine.

May 13.—Progressing favourably since last report; but there is slight pyrexia, especially towards evening, evidenced in increased heat of hands and arms, and forehead and face feel hot at times. Pulse this morning 64, full and regular. To have a dose of simple diaphoretic mixture at 11 A.M. and again at 2 P.M.

May 15.—Is much better; diaphoretic mixture relieved the feverish symptoms; skin now cool and perspirable;

tongue clean; pulse 62; appetite returning. Continue chloride of ammonium morning and evening; liquor ammon. acet. draught in the interval as before.

May 18.—Doing well; pulse 56, full, slow, and regular; port wine four ounces.

May 26.—Since last report has continued steadily to improve; tongue clean, smaller, not so flabby as formerly, and indentations caused by teeth disappearing. Hepatic dulness commences over sixth rib of right side, and extends about half-an-inch below margin of right lower ribs in a gently curved line upwards towards epigastrium. *Pari passu* with the improvement of the symptoms, local and general, the action of the medicine has been less and less manifested, so that its effects are now not so marked.

May 30.—Since last report patient has been allowed to sit up, from time to time, daily; he is now convalescent, and, beyond feeling side a little stiff, is free from pain or other uneasiness. The edge of the liver can no longer be traced under the margins of lower ribs, and firm pressure causes no pain over the hepatic region.

Note.—On reference to the case book from which the above was abstracted, I find that the temperature, as taken during the progress of the disease, ranged from 98·5° to 101°. The temperature was, for some reason or other, not taken from the commencement, or in all probability a higher temperature would have been recorded. The man's medical history sheet further showed that he had suffered from dysentery in Bellary in 1862 for seventy-two days, and that he had had two previous attacks of hepatitis in Secunderabad in 1868. From the time of his recovery from abscess of the liver, June, 1870, till the attack of heat apoplexy which caused his death, on July 7, 1872, he had only been twice in hospital with trivial complaints, in no way connected with the previous attack of hepatic abscess.

Autopsy, three hours after death. Notes taken and recorded by Assistant-Surgeon F. E. Barrow, 89th Regiment, doing duty with 2-21st Fusiliers.

Rigor mortis had not set in. The body was moderately well nourished; face sallow; skin thin.

Encephalon.—The membranes of the brain were slightly thickened, otherwise healthy to all appearances.

Thorax.—Lungs. The right pleura was adherent to the chest walls by bands of organised lymph; the left was very adherent, and required the aid of the scalpel to separate it from the parietes; on section, both lungs were much congested, and the left presented one or two apoplectic patches in its lower lobe. The larger and smaller bronchial tubes were filled with frothy mucus throughout the lungs.

Heart.—Flabby and enlarged; pericardium thickened and very adherent; heart walls soft and showing signs of fatty degeneration; valves healthy; a mass of fat surrounded the origin of the great vessels at base of heart. Aorta healthy, but somewhat contracted at its origin.

Abdomen.—The liver was enlarged, especially the right lobe. The surface was smooth, but here and there were a few opaque spots, due to thickening of Glisson's capsule. On the upper surface of right lobe, and corresponding in direction to the fissure of gall-bladder on its under surface, was an abnormal fissure, one or two lines in depth. This lobe also presented on its upper convex surface a marked depression, circumscribed, and about the size of a three-penny piece. On section the liver had a nutmeg appearance throughout, and on cutting through the puckered depression on upper surface, distinct cicatricial tissue was seen, and from it one or two bands of connective tissue dipped into the liver substance. The lobules around were indistinct and enclosed in a fibro-areolar network.

Remarks.—It will be seen by reference to the above case, that the chief seat of pain and tenderness, which continued more or less throughout its progress, was at a point situated between the fifth and sixth ribs, midway from their extremities. The

puckered depression on the surface of the liver occupied a nearly corresponding situation, but somewhat lower, (about the lower margin of fifth rib,) which would be accounted for by the upward enlargement of the liver which attended the formation of the abscess, and its subsequent subsidence. Morehead, in his researches on disease in India, relates a case in which an abscess of the liver was punctured through the abdominal parietes, and a pint of pus discharged. The patient died from a second abscess and dysentery a year afterwards. On examination a small puckered cicatrix, caused by the lancet puncture, was seen beneath the point of the eighth right rib. On the convex surface of the liver near its free margin, corresponding in situation to the fundus of the gall-bladder, there was seen a small puckered cicatrix. There was no adhesion of this or any other part of the convex surface of the projecting portion of the liver to the abdominal parietes, and the small puckered cicatrix observed on the surface of the latter did not at all correspond to that on the liver, but was an inch and a half above and internal to it. On incising the liver in the situation of the cicatrix, a white and fibrous appearance was seen to the extent of about four lines. On this case Morehead remarks, 'We may not doubt the fact of abscess having been opened here and cured. The question arises, Was there absence of adhesions when the abscess was opened? or may we suppose that consequent on the cure of the abscess adhesions previously existing, but now no longer required, were gradually removed

by atrophy? The latter is I think the probable view ; and it is countenanced by the want of correspondence found after death between the external and the internal cicatrices.'

In all my observations hitherto made, I have taken it for granted that a correct diagnosis had been made and the treatment commenced at a sufficiently early period to justify the expectation of success ; but that this essential element is often wanting will be readily admitted by all who have had a large experience in the treatment of tropical disease. And a perusal of the medical returns rendered throughout India would, I feel confident, show that a considerable number of cases of hepatitis go on to a fatal termination in abscess of the liver unsuspected during life ; and that perhaps a still larger number are only diagnosed a short time before death ; too short to admit of the faintest hope of success by treatment. Acknowledging the difficulty and doubt which at times surround the diagnosis, and believing that nothing short of individual experience will be effectual in dispelling them, I think, with Morehead, that our authors and teachers are in some degree responsible in not laying sufficient stress on the necessity of a careful examination of the liver in the case of every man coming to hospital, particularly when he complains of feverish, dyspeptic, dysenteric, or hæmorrhoidal symptoms.

On the difficulties spoken of by authors as at times attending the diagnosis of hepatitis, Morehead remarks, ' My conviction is that under careful enquiry

as to symptoms of diathesis, and just attention to previous history as respects former disease and exposure to predisposing and exciting causes, liver abscess unsuspected or undetected during life ought to be a much rarer event than is generally supposed. The contrary opinion has a manifest tendency to encourage careless and apathetic investigations and to cripple the effects of medical art.'

The fact is that if we would avoid errors in diagnosis in the treatment of tropical disease, it is as necessary to make frequent and careful examination of the hepatic region, as it is to feel the patient's pulse or look at his tongue.

CHAPTER V.

STATISTICS OF THE TREATMENT OF HEPATIC DISEASE IN THE 2ND BATTALION, 21ST FUSILIERS, DURING ITS SERVICE IN INDIA, FROM 1ST JANUARY, 1865, TO DECEMBER, 1872, WHEN THE BATTALION LEFT FOR ENGLAND. CONCLUDING REMARKS AND OBSERVATIONS.

THE subjoined tables give the admissions and deaths from hepatic disease in the hospital 2-21st Fusiliers for a period of eight years in various parts of the Madras presidency and British Burmah.

From January 1, 1865, to August 31, 1869, (a period of four years and eight months,) the expectant or symptomatic treatment, with or without ipecacuanha, nitro-muriatic acid, or other remedies of reputed efficacy, was employed, and the result is shown in Table I.

TABLE I.

Disease	Admitted	Discharged	Died	Remarks
Hepatitis, acute and chronic . . . }	261	233	28	

Note.—In the old nomenclature, abscess of the liver and simple enlargement had no place; all these cases were returned under the head of acute and

chronic hepatitis. The deaths were all caused by abscess of the liver.

From September 1, 1869, to December 1872, a period of three years and four months, chloride of ammonium being the remedy employed, the result is given in Table II.

TABLE II.—Hospital 2-21st Fusiliers.

Disease	Admitted	Discharged	Died	Remarks
Simple enlargement of liver . . . }	33	33	—	
Hepatitis	104	104	—	
Abscess of liver . .	16	16	—	
Total	153	153	None	

Note.—These diseases would have been returned formerly under the head of ‘acute and chronic hepatitis.’

These figures are more eloquent than words. Under the ordinary treatment the result was highly unsatisfactory; many cases baffled the skill of the practitioner, the disease persisting in the chronic form or terminating in abscess, of which eighty per cent. terminated fatally, as shown by statistics collected for a series of years from various sources.¹

The saving of life which my earlier experience in the use of the remedy led me to expect has been amply fulfilled in my own practice; and the cases which have since been communicated to me by friends, and those which have appeared from time to time in the ‘Madras Medical Journal,’ also show that

¹ See Appendix, p. 84.

success has been attained elsewhere in the hands of others.

But in addition to the saving of life thus shown to have been effected, I believe it will be found that the time under treatment in cases of hepatitis is considerably less than by any other method, and that a relapse or recurrence of the disease is much less likely to occur after the use of the chloride of ammonium. That this is a great advantage in cases of liver congestion and primary acute hepatitis, no one can doubt who has witnessed the constant recurrence of the disease in the chronic form, in patients who had previously experienced an acute attack—the liver enlargement persisting, and the patient perhaps in the end requiring change of air to Europe for the relief of his suffering or to prevent his disease proving fatal.¹

In all the cases shown in Table II. the hepatitis was primary, the fever being symptomatic, modified in some few instances by a malarial cachexy or a malarial state of air at the time. In such instances a midday dose of quinine was given, and the use of the chloride at the same time persisted in.²

In not one of the cases in which the chloride of ammonium was administered from an early period of the disease was dysentery observed to supervene, an

¹ Of the less liability to relapse I have no doubt. The time under treatment I hold to be of little importance. I am in the habit of keeping the patient from ten to twelve days in hospital, after all symptoms of the disease have subsided, to lessen the liability to a relapse or recurrence.

² See Appendix, p. 88.

occurrence which under previous methods of treatment was not infrequent.

The conclusions which may fairly be arrived at by a comparison of the preceding facts and figures, and which are strengthened by the result of experience in the treatment of individual cases, the importance of which can hardly be over-estimated, are these—that by the universal and persistent employment of the medicine, according to the rules laid down, in congestion of the liver, that condition may be so speedily and effectually removed by a few doses of the salt, that the hepatitis in which, if neglected or not completely subdued, it is so apt to terminate, will be a less likely occurrence than heretofore; and in the same way by its timely employment in cases of acute hepatitis there will be less likelihood of the disease terminating in abscess of the liver than formerly. This much I can state for certain, that from the commencement of the chloride of ammonium treatment till the departure of the 2-21st Fusiliers from India, a period of nearly four years' duration, 'chronic hepatitis,' the chronic liver enlargement formerly so prevalent in the regiment, and such a fertile source of sickness and invaliding, was practically unknown.

APPENDIX.



Page 26.—From the powerful effect of the medicine in relieving the portal circulation, it is, as might be inferred, of benefit also in painful enlargement of the spleen depending on hypercæmia. The spleen, according to an ingenious hypothesis advanced by Dr. H. Silvester, and published in a pamphlet in 1871, may be looked upon as the left lateral homologue of a portion of the liver, the liver being a combination of a sanguiferous gland and a biliary apparatus.

It need not occasion surprise if, in the treatment of a case, say of hepatitis, accompanied by great anxiety, pain and tenderness in the hepatic region, and general pyrexia, the patient should fail to inform the medical attendant of the *special symptoms produced by the medicine*, unless specially requested so to do. In instances in which, as it turned out afterwards, the special symptoms were most striking and singular, the patients failed to give a spontaneous account of them. In these instances they appear to be wholly absorbed in their sufferings, and although aware of what takes place after the exhibition of the medicine, they are incapable of distinguishing between the effects of the latter and some new phase of the disease with which they doubtless sometimes confound them. But tell such a patient to observe the effects of the medicine from the moment he swallows the dose till the cessation of all sensible action, so that you may interrogate him at the next visit as

to the symptoms experienced, and the regularity and certainty of its action, as well as the varied and characteristic symptoms induced, and the relief afforded will be sufficiently manifested.

Page 42.—At page 77, Rutherford and Vignal: Experiments on the Biliary secretion of the dog, in 'British Medical Journal' of July 7, 1877, under the head of Action of Ammonium Chloride, occurs the following:—

'Chloride of ammonium is by some considered a cholagogue (Garrod's "Materia Medica," 4th edition, p. 51). Dr. W. Stewart (quoted in Wood's "Therapeutics," 1874, p. 446) has highly recommended it in cases of chronic torpidity of the liver, given in doses of twenty grains thrice a day for weeks or even months.'

Dr. Rutherford's experiments went to show that chloride of ammonium had no effect on the biliary secretion of the dog, and he concludes as follows:—'Inasmuch, therefore, as these experiments give no evidence of any stimulant action of this substance on the liver, and seeing that in the human subject also there is no certain evidence of its having any direct cholagogue action, one is led to ask whether the effects observed by Dr. Stewart, in cases of chronic hepatic torpidity, may not have been the result of some indirect action on the liver, due to a slight but prolonged increase of the intestinal secretion, or to some effect on the system generally.'

Now herein clinical observations and physiological experiments agree. I have never attributed to chloride of ammonium any *direct* cholagogue action, either in health or disease; but in the congested and functionally deranged liver, I have shown how it relieves the organ of retained biliary secretion, and how by its action on the portal circulation, under the same conditions, it restores healthy functional activity, for the carrying on of *all* the vital processes to which the liver is subservient, among these, (and probably also one of the least important,) being the secretion of bile.

Unfortunately my papers on the subject were written for

the Indian medical journals when I was in a remote frontier station in British Burmah, and were therefore inaccessible to the general profession in this country and America.

Since the publication of his experiments on the biliary secretion of the dog, I have forwarded to Dr. Rutherford a paper of mine on chloride of ammonium in the treatment of hepatic disease, published in the 'Philadelphia Medical Times,' together with a letter on the subject, to which Dr. Rutherford writes in reply:—'What you say of the action of chloride of ammonium in hepatic congestion is exceedingly important and interesting;' and among other matters he refers to my not having made any mention of a purgative effect in the paper alluded to. In the foregoing pages I have referred to this as an occasional effect. Dr. Rutherford concludes his letter to me as follows:—'In the second edition of my experiments I will bear in mind to allude at greater length to your observations, for I fear lest my experiments may rather tend to discountenance chloride of ammonium in hepatic trouble.'

Page 44.—Purgatives commonly recommended at the onset of hepatitis are to be carefully avoided, because I believe, with Morehead, that in many instances the exhibition of such irritants lays the foundation of the dysentery, so often an accompaniment. A mild purgative may be prescribed at the onset if indicated; but, with the use of chloride of ammonium, its repetition will seldom be required. Counter-irritants, too, with the exception of sinapisms in a few instances, I have never employed; blisters are contra-indicated, owing to their irritating action on the kidneys preventing the due elimination of diseased products by these emunctories under the influence of the chloride of ammonium; and, as pointed out by Morehead, there is a 'risk also that the cutaneous and subcutaneous fulness caused by serous effusion consequent on the irritation of a blister may, if present at and below the margins of the right ribs, be mistaken for the sign of liver enlargement, and an erroneous inference in reference to the progress of the disease be

therefore entertained.' Besides, when I was in the habit of using blisters formerly in hepatitis, I found them in some cases do more harm than good, increasing the pain they were intended to allay, and adding greatly to the patients' distress and feverishness.

Page 46.—Chloride of ammonium being a general stimulant does away with the necessity for the employment of alcoholic stimulants in the considerable quantities otherwise required; and unlike them exercises a beneficial action on the liver, instead of increasing the diseased condition which it is our object to remedy. Formerly patients used to crave for them, because by their use sensibility to pain was blunted. Except in serious cases, I seldom prescribe them, *and then* as a rule in small quantities only, say six ounces of wine in the twenty-four hours.

Pages 47 and 78.—Having shown how successful the treatment has been in my own hands, I will now point out what I consider to be the chief reason why a like measure of success has not been obtained elsewhere. And first, I would remark that from letters which I have received from medical officers of my acquaintance, serving at different stations throughout India, and from conversations with my friends, who were in the habit of using the chloride of ammonium, it is quite evident that one of the essentials to success, viz., *absolute rest in bed in the recumbent posture, during the whole course of the disease*, was almost entirely neglected, or else not strictly enforced. In fact, I have found that patients under the chloride of ammonium treatment were very generally allowed to get out of bed, to sit up in arm-chairs, and to go to the night-stools, &c. As might be expected under the circumstances, the recovery is retarded or imperfect; or in cases of abscess of the liver death occurs much more frequently than otherwise would be the case were the rule of absolute rest in bed strictly enforced.

In my pamphlet and other published papers I dwelt, as I thought, fully and explicitly on this point as one, without attention to which all our efforts would be hopeless; and I

pointed out the immediate danger to life which resulted from allowing patients suffering from hepatic abscess to quit their beds to go to the night-stool, or for any purpose whatever. Since then several instances have come to my knowledge of patients suffering from abscess of the liver actually dying sitting up in the chair, or on the night-stool; or else the fatal result has been brought about, if less directly, quite as certainly, from rupture of the abscess into the peritoneal cavity from the same cause; a circumstance which is apt to be overlooked and not enquired into unless the patient himself should think of mentioning that he felt something 'crick' or 'give way' in his side while sitting up, moving about, or while on the night-stool, &c.

But even in fatal cases, where the chloride of ammonium had been used without attention to this important rule, (a rule which I hold to be absolutely necessary for success,) and where the treatment had been commenced in time to admit of the probability of success being obtained, it has been observed by those who have communicated with me on the subject, that the progress to the fatal issue was smoothed and prolonged by the use of the chloride of ammonium, and the *post-mortem* examinations of such cases have revealed the liver tissue surrounding the abscess cavity in a healthy state, of natural colour and consistence, free from congestion or other morbid appearances, and unlike that commonly found surrounding the cavities of hepatic abscesses.

With regard to the rule of absolute rest in bed, the greatest difficulty will be experienced in getting all concerned to have it carried out effectually; and nothing but unremitting care and attention on the part of the prescriber, medical subordinates, and orderlies in charge of the patient, will prevent him quitting his bed; for, as a rule, patients suffering from hepatitis are peevish and wayward in the extreme, and are with difficulty managed. I am in the habit, in serious cases, of having two men daily from the ranks to take it turn about (every two hours) to remain with the patient; and written instructions are read to these men, when coming

on duty, by the hospital sergeant, in which the necessity of preventing the patient either getting out of bed, or even moving suddenly in it, is enforced. The patient is not even allowed to leave his bed for the purpose of changing sheets or having it made; but when this is required, another cot is provided, with a change of bedding, on which he is gently moved in the horizontal position by the attendants, a bed pan and urinal being kept constantly at hand for his use.

In reference to my remarks on the treatment of hepatitis and hepatic abscess hitherto made, I have taken it for granted that, with all the confessed difficulties at times surrounding the diagnosis, the latter has been made sufficiently early to justify a reasonable prospect of success from the treatment; but that this further element for success is oftentimes wanting, every one who has had much Indian experience will be free to admit. In the Army Medical Reports for 1869 there is a very instructive paper by Dr. Adams on the mistakes liable to be made in the diagnosis of hepatic disease, which is well worth careful perusal. Shortly before leaving India two cases exemplifying the liability to error in the early and remediable stage of hepatic disease came to my knowledge. Both occurred in the persons of natives, and in both the patients were supposed to be suffering from intermittent fever. One, whom I was asked to see in consultation, had been ill for about a month before the true nature of the disease was suspected. He was then suffering from hectic fever, and the liver formed a tumour occupying the greater part of the right side of the chest and abdomen, extending into the left hypochondrium. Chloride of ammonium was now prescribed with the necessary precautions, but without the slightest hope of its doing more than palliating the patient's sufferings. Death took place in two or three days afterwards, and the *post-mortem* examination revealed the existence of an enormous abscess, of which the containing cyst and compressed liver tissue were only about two lines in thickness.

The chief difficulty will be experienced in those occa-

sional cases in which the abscess forms slowly, is small, deep, becomes encysted and quiescent, or has partially undergone absorption. 'Such may endure for months, it may be for years, and give only occasionally, and at long intervals, obscure indications of its presence. Still, even in these rare instances, the feeble general health and the character of the occasional derangements, viewed in connection with the previous history, may generally serve to excite our apprehensions in respect to the condition of the liver.'

Sir J. Fayrer, in a valuable paper in the 'British Medical Journal' of September 26, 1874, gives a case which is extremely interesting as showing how insidiously liver abscess will sometimes form.

Page 64.—In all cases where there is a visible fluctuating tumour it is generally recommended that an opening should be made for the discharge of the matter. In all cases where an external opening is made the measures recommended by Professor Lister should be rigidly enforced; and where the abscess is large recovery will sometimes be hastened by making a counter opening and passing a drainage-tube through both openings. Where there are no local signs of abscess, but where the constitutional symptoms leave little doubt of its existence and are severe, it has been recommended to make one or more exploratory punctures with the aspirator. Even if the abscess be not reached, the direct abstraction of a small quantity of blood from the liver sometimes gives great relief; and there have been many recorded cases of benefit derived from such punctures made with the needle of the aspirator when not a drop of blood followed the operation. Should a case occur in my own practice in which it was considered advisable to evacuate an abscess, either by the knife or aspirator, while doing so, I should at the same time persevere in the use of the chloride of ammonium. In the sixteen consecutive cases of abscess of the liver treated by me without a single death, the question of operating either by the knife or aspirator was never entertained. In two of them the pus was discharged (at all events in part)

by the bowels; in others, as in Case XI., and presumably also in Cases X. and XIV., it was absorbed or else converted into an encysted residuum, as pointed out by Rokitsansky.

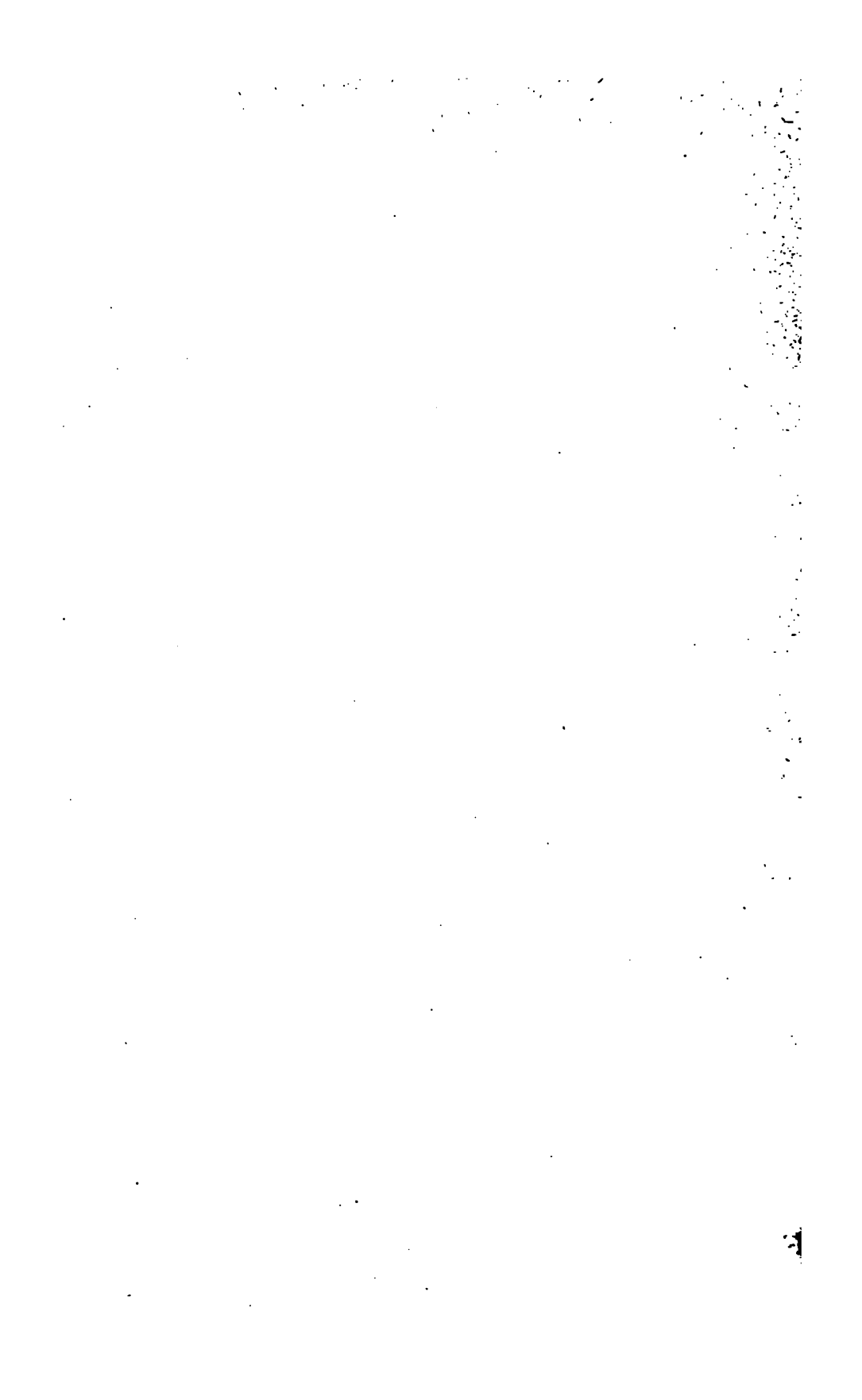
Page 79.—I have no observations, founded on personal experience, to offer concerning the treatment of hepatic abscess secondary to or associated with severe or malignant remittent fever; but in a disease so serious in itself, even when uncomplicated, and in which the patient may be carried off in the violence of the earlier paroxysms, in the remission by sudden and fatal collapse, or at a later period, owing to the disease having assumed the continued or adynamic form, I should endeavour, in accordance with the practice of the most experienced writers on the subject, first to arrest the fever by the exhibition of quinine in full doses—‘not less than fifteen grains in the case of an adult,’ as inculcated by Professor Maclean. In Warburgh’s tincture we possess a remedy capable of at once arresting remittent fever, should the urgency of the symptoms or the severity of the complication call for its exhibition in preference to quinine. The fever once arrested, or materially controlled, the chloride of ammonium should be administered with the view of combating any hepatic complication that may have arisen in the course of the disease, with a reasonable prospect of success, provided the liver were not entirely disorganised from excessive congestion and contamination of the circulatory fluids.

On this subject I would refer to Dr. Maclean’s views of the treatment of remittent fever, in Dr. Aitkin’s ‘Practice of Medicine’ (1872, page 636), wherein the modes of administration of quinine, &c., are laid down; to which must now be added its subcutaneous injection (neutral sulphate preferable) in severe cases. Dr. Maclean also speaks highly of Warburgh’s tincture, and gives certain cautions which must be carefully attended to in its use. It is now procurable from the medical stores in India, and has not, I believe, received so much attention from the profession as it deserves, perhaps because it was till lately a secret remedy. I have

known a single dose of it cut short, as if by crisis, with profuse perspiration, a remittent with cerebral complication, which every moment threatened the patient's life. After the operation of the medicine the congested and almost livid countenance became pale and sunken, and stimulants and beef tea had to be exhibited to prevent collapse; but the patient from that moment was cured of his fever.

Pages 3, 44, 46.—It cannot be too often insisted that the chloride of ammonium should never be given while there is pyrexia with hot and dry skin. If it be given under such circumstances, it will not act characteristically. The general febrile and local symptoms must first be allayed by the means pointed out (liquor ammoniæ acet. in frequently repeated doses); or in severe pyrexia with high temperature, one-sixteenth of a grain of tartar emetic (if there be no sickness) every three or four hours till perspiration be induced freely; and after the commencement of the chloride, should the skin at any time become *hot and dry*, recourse must be again had to the liquor amm. acet. mixture to insure the proper action of the medicine, which may be given between the morning and evening dose of the latter, or the chloride may be omitted if necessary till a moist state of the skin is induced. By not attending to this circumstance I have known the medicine cause very unpleasant effects instead of bringing speedy relief.





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